In The

Supreme Court of the United States

DEC 29 1
MICHAEL RODAK, JR.

October Term, 1973

No. 73-1315

MORNINGSIDE RENEWAL COUNCIL, INC., and RIVERSIDE DEMOCRATS, INC.,

Petitioners,

vs.

UNITED STATES ATOMIC ENERGY COMMISSION, UNITED STATES OF AMERICA and TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK,

Respondents.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT

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vs.

UNITED STATES ATOMIC ENERGY COMMISSION, UNITED STATES OF AMERICA and TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK,

Respondents.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT

Petitioners Morningside Renewal Council, Inc. and Riverside Democrats, Inc. respectfully pray that a writ of certiorari issue to review the judgment and opinion of the United States Court of Appeals for the Second Circuit entered in this proceeding on July 5, 1973.

OFFICIAL REPORT OF OPINION BELOW

The official report of the majority opinion and dissenting opinion delivered in the Court below is found at 482 F.2d 234. Copies of such opinions are annexed hereto.

JURISDICTION

The judgment sought to be reviewed was dated and entered on July 5, 1973. A timely petition for a rehearing was denied by order dated and entered on October 4, 1973. The same petition, treated as a petition for a rehearing en banc, was denied by order dated and entered on October 4, 1973, with three judges dissenting. Copies of such orders are annexed hereto. The statutory provisions believed to confer on this Court jurisdiction to review the judgment in question by writ of certiorari are 28 U.S.C. Section 2350 and 28 U.S.C. Section 1254(1).

QUESTIONS PRESENTED

1. Must the Atomic Energy Commission establish generally applicable substantive safety criteria for research reactors prior to the licensing and operation of Columbia University's nuclear reactor?

2. Must the Atomic Energy Commission prepare an environmental impact statement pursuant to the National Environmental Policy Act of 1969 prior to the licensing and operation of Columbia University's nuclear reactor?

STATUTES, REGULATIONS AND OTHER PROVISIONS INVOLVED

With respect to Question 1:

Title 10, Code of Federal Regulations:

Section 2.801. Initiation of rule making — Rule making may be initiated by the Commission at its own instance, on the recommendation of another agency of the United States, or on the petition of any other interested person.

Section 50.40. Common standards — In determining that a license will be issued to an applicant, the Commission will be guided by the following considerations:

(a) The process to be performed, the operating procedures, the facility and equipment, the use of the facility, and other technical specifications, or the proposals in regard to any of the foregoing collectively, provide reasonable assurance that the applicant will comply with the regulations in this Chapter, including the regulations in Part 20, and that the health and safety of the public will not be endangered.

(b) The applicant is technically and financially qualified to engage in the proposed activities in accordance with the regulations in this Chapter.

(c) The issuance of a license to the applicant will not, in the opinion of the Commission, be inimical to the common defense and security or to the health and safety of the public.

(d) Any applicable requirements of Appendix "D" have been satisfied.

Section 50.41. Additional standards for class 104 licenses. — In determining that a class 104 license will be issued to an applicant, the Commission will, in addition to applying the standards set forth in section 50.40 be guided by the following considerations:

(a) The Commission will permit the widest amount of effective medical therapy possible with the amount of special nuclear material available for such purposes.

(b) The Commission will permit the conduct of widespread and diverse research and development.

* * *

With respect to Question 2:

National Environmental Policy Act of 1969, Section 102 (42 U.S.C.A. Section 4332):

The Congress authorizes and directs that to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this chapter, and (2) all agencies of the Federal Government shall —

* * *

(c) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on —

(i) the environmental impact of the proposed action,

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of longterm productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal Agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State, and local agencies, which are authorized to develop and enforce environmental standards, shall be made

> available to the President, the Council on Environmental Quality and to the public as provided by section 552 of Title 5, and shall accompany the proposal through the existing agency review processes.

Guidelines of the Council on Environmental Quality (36 Federal Register 7724):

> The statutory clause "major Federal actions significantly affecting the quality of the human environment" is to be construed by agencies with a view to the overall, cumulative impact of the action proposed (and of further actions contemplated). Such actions may be localized in their impact, but if there is potential that the environment may be significantly affected, the statement is to be prepared. Proposed actions, the environmental impact of which is likely to be highly controversial, should be covered in all cases.

STATEMENT OF THE CASE

Columbia University was granted a construction permit by the Atomic Energy Commission (the "Commission") to build a Triga Mark II reactor on its Morningside Heights campus in Manhattan, New York City, on December 30, 1963. Morningside Heights is a densely populated area, having an average of 628 persons per net residential acre. Within a few blocks of the area, population density approximates 1,000 persons per acre. The median range within Manhattan is 500-600 persons.

Triga reactors are research reactors manufactured by a subsidiary of Gulf Oil Corporation. According to information supplied by Gulf and Columbia, 29 Triga reactors of various descriptions are in operation, under construction or contracted for in the United States. Numerous other research reactors are operated by universities and others in the United States.

The Columbia reactor was built with funds of the National Science Foundation. The Commission has agreed to provide funds for the fuel elements needed to operate the reactor. The total grants from agencies of the federal government amount to approximately $671,000.

After the reactor was built, Columbia sought an operating license and on March 18, 1968, the Commission gave notice of the proposed issuance of an operating license. The petitioners requested leave to intervene in the proceeding in April, 1968, and after a long adjournment requested by Columbia, were granted leave to intervene in June, 1969.

The proceeding was heard initially before an Atomic Safety and Licensing Board, composed of three members – Valentine B. Deale, Esq., a Washington, D.C. attorney, Chairman; Dr. Eugene Greuling, Professor of Physics at Duke University, and Mr. Hood Worthington, a retired physicist from du Pont de Nemours & Co. None of these was a Commission staff member.

At hearings in New York City in November, 1969, and July, 1970, the petitioners' witness, Dr. William J. Nicholson of the School of Medicine at Mount Sinai Hospital, New York City, proposed that a catastrophic

accident could occur by virtue of the rupture of the cladding of one or several fuel elements of the reactor in air at a high temperature. He indicated a likely fission products release fraction of 4 per cent (40,000 parts per million) based on the results of certain Commission sponsored tests, known as the SNAPTRAN tests. Such a release, he testified, could give a thyroid dose of 20 rem outside the reactor building from the rupture of one fuel element and 1400 rem from the rupture of all 70 fuel elements in the reactor. Such a dose compares with the concentration of one rem or less allowable under the standards for normal operation set by the Commission. The Licensing Board noted that there was no questioning the 4 per cent figure as being properly related to such a high temperature accident.

Dr. Nicholson urged a conservative approach to the type of accident that should be postulated for purposes of assuring the public safety. His approach was to postulate an accident producing a release of radioactivity such as had occurred under experimental conditions. This conservative approach is similar to that which is used in evaluating the safety of power reactors, in which the accident postulated is one resulting in the release of appreciable quantities of fission products. Dr. Nicholson suggested various accidents or incidents, including sabotage and a falling aircraft, that might result in a substantial release of fission products. His testimony that such accidents might cause serious consequences was consistent with the Safety Analysis Report submitted by Columbia.

Columbia and the Commission's Regulatory Staff, on the other hand, proposed a less serious accident, the failure of the cladding of a single fuel element at a lower temperature while exposed to air. Referring to an

experiment performed in 1966 by Gulf, Columbia reported that the maximum fission product release from this accident was 15 parts per million. In presenting this calculation, however, Columbia failed to take into account an earlier experiment of which it was aware conducted by Gulf in 1960. This experiment gave a release fraction for the same accident of 9600 parts per million. Dr. Nicholson first exposed this inconsistency, testifying that "this changes these calculations from a discussion of a minor problem to that of a major catastrophe."

It was further brought out at these hearings that the fission products release fractions postulated by the Regulatory Staff for purposes of safety calculation in the case of previously licensed Triga reactors had been inconsistent in the extreme, ranging from 10 parts per million to 28,000 parts per million.

On April 6, 1971, the Licensing Board issued an Initial Decision denying authorization to issue an operating license. While not accepting the petitioners' proposed accident, the Licensing Board noted the absence of applicable substantive criteria in regard to accidents to research reactors and ruled as follows:

> "B. The absence of applicable substantive criteria of the Commission and of convincing objective standards of the regulatory staff — all quite distinct from provisions at 10 CFR Part 50, such as at sections 50.40 and 50.41 (b) — prompts the Licensing Board to decline answering the question of whether the health and safety of the public would be endangered upon the occurrence of a postulated accident to the applicant's reactor. The Licensing Board considers it inappropriate to

> enforce an answer derived from the narrow confines of a single proceeding and its own personal views about the degree to which the health and safety of the public ought to be protected against accident consequences."

On the subject of the conflict in experimental data, the Licensing Board ruled as follows:

> "C. In the Licensing Board's opinion, the fission products release fraction under postulated accident conditions for such a standard product as a Triga reactor ought to be a matter of proven determination and unquestionable validity. From the Licensing Board's standpoint, resolution of existing conflict in data and ascertainment of firm figures ought to be accomplished through a new experiment under the auspices of the regulatory staff. The sponsorship of such an experiment, in the Licensing Board's view, is within the province of the regulatory staff in attending to the interests of the public in the process of licensing Triga reactors. There ought to be an end to the past practice of the regulatory staff, which lessens its credibility, of shifting basis in its safety evaluation of accident conditions from one Triga case to another by varying the combination of postulated accident and fission products release fraction assumed."

In its exceptions to the Initial Decision filed with the Atomic Safety and Licensing Appeal Board, Columbia did not take issue with these principal rulings of the Licensing Board and indeed called upon the Commission to conduct

a further experiment on "an objective and impartial basis". The Regulatory Staff filed exceptions claiming that the operating license should have been issued. The petitioners, while concurring in the principal rulings of the Licensing Board, also filed exceptions to certain rulings of the Licensing Board, including its refusal to require a NEPA environmental impact statement. The Gulf Oil Corporation initially stated on April 12, 1971, in a letter from Ralph H. Peters to all U.S.A. Triga owners, that it was "most anxious to see that new independent experiments are conducted as quickly as possible."

Barely a month after writing this letter, Mr. Peters wrote a letter to Dr. Peter A. Morris, the Director of the Commission's Division of Reactor Licensing, the first of an exchange of letters signed "Ralph" and "Pete", in which he advised that Gulf intended to conduct further experiments. The letter stated: "We hope to have you or members of your staff participate fully in these experiments so that they will be deemed to have been done 'under the auspices of the Regulatory Staff'." Dr. Morris responded by advising that Robert J. Schemel of his Division would attend the tests "as an observer". This correspondence was submitted to the Appeal Board on May 27, 1971. Dr. Morris was then advised by Mr. Peters on May 27, 1971, that the tests would begin on June 17, 1971. The Appeal Board was then so advised. On June 14, 1971, the Appeal Board ordered a new hearing, stating that it desired that information concerning the results of the new experiments be included in the record as new evidence.

On September 9, 1971, Columbia requested that the hearing date then scheduled for October 27, 1971, be cancelled and the proceeding held in abeyance "until there

has been a reasonable opportunity for Columbia University — and for any other party who may so desire — to assess the implications of *Calvert Cliffs* for this proceeding and to inform the Appeal Board of its views in connection therewith." The decision referred to, *Calvert Cliffs Coordinating Committee, Inc. v. United States Atomic Energy Commission*, 449 F.2d 1109 (D.C. Cir. 1971), held in part that the Commission's regulatory processes had failed to meet NEPA requirements. The Regulatory Staff indicated that it had no objection to this request. Nonetheless, the request was denied by the Appeal Board and the hearing date of October 27, 1971, was confirmed. The petitioners, who had maintained that the evidence already in the record mandated an environmental report, then moved for leave to introduce further evidence from Dr. Ernest J. Sternglass of the School of Medicine at the University of Pittsburgh, regarding the effects of Triga reactors on the health, safety and environment of surrounding residents.

Hearings were held on October 27, 1971, and February 15, 1972, before the three-member Appeal Board, which included two ranking permanent staff members of the Commission. At these hearings Dr. Sternglass, who previously had published papers presenting evidence that low levels of environmental radiation from nuclear weapons tests, nuclear power reactors and fuel processing facilities appear to have led to detectable rises in childhood leukemia, chronic respiratory diseases and infant mortality, reported his study of infant mortality and prematurity in the neighborhood of three Triga reactors.

Data on infant mortality rates for the town of State College, Penna., in which is located the Pennsylvania State College reactor and for Lebanon City, a control city 90 miles to the east, were compared. With 1962 as a reference equal to 100, infant mortality in State College rose to 229 in 1968 but in Lebanon City declined to 48. Moreover, in addition to this upward trend, two clear peaks of infant mortality occurred in State College in 1965 and 1968. These peaks correspond to the measured peaks of total beta activity and also of unidentified beta activity discharged by the reactor.

In Urbana, Illinois, site of the University of Illinois Triga reactor, infant mortality, with 1962 as a reference equal to 100, increased to 296 in 1963, 233 in 1964, 430 in 1965, 314 in 1966, 287 in 1967 and 151 in 1968, while in McLean County, a control county 20 to 60 miles to the northwest, infant mortality declined during this period. Again, the levels of infant mortality were related to possible increases and decreases in radioactive discharges, in that the reactor became operative in late 1960, was upgraded to a power of 250 kilowatts in 1965, sustained an accidental release in 1966 and was shut down for extensive modifications in 1968.

With respect to the Triga reactors operated by Gulf Oil Corporation in San Diego, California, rises in infant mortality up to 10.7% (2-½ standard errors) took place in San Diego County relative to California as a whole within a year after a prototype Triga reactor went into operation, peaking the year following the reported release of fresh fission products from a damaged fuel element in 1963. Following start-up of the Gulf Trigas in 1960, the rate of infant mortality in San Diego County exceeded the rate in

California as a whole in each of nine consecutive years, whereas in previous years there was no such uninterrupted pattern.

Additional evidence was introduced at these hearings concerning radioactive discharges from the Pennsylvania State College Triga reactor. In the case of this reactor, argon-41 radioactive gas is released to the environment from the pneumatic sample changer and the dry irradiation tubes and from the reactor pool water. No accurate measurement of such releases has been made, although it was brought out at the hearings that such releases were underestimated in official reports by three to nine times in the last five years. In addition, liquid radioactive wastes have escaped into the environment either through accidental leakage from the reactor pool or through deliberate discharges from the hold-up tank which receives the liquid waste produced in the regeneration of the reactor pool demineralizer. Leakage from the reactor tank, which amounted in 1970 alone to 101,180 gallons, presumably reached the underground water system. Except for the pool water leakage, all other liquid waste was discharged to a storm water system. This waste included or may have included thirteen different isotopes. Total liquid waste release reached peaks of 3,475 microcuries in 1965, 2,292 microcuries in 1968, 11,321 microcuries in 1970 and 2,969 microcuries in 1971.

The Appeal Board, on May 18, 1972, issued a Decision authorizing the issuance of an operating license. On the issue of standards, the Appeal Board agreed with the Licensing Board that there were no applicable regulations establishing safety standards for research reactors. The Appeal Board went on to hold, however, that the absence

of standards would not inhibit it from passing on the safety of the reactor "under the circumstances of this case." It did, nonetheless, strongly recommend that specific standards for the evaluation of an accident situation in a research reactor should be formulated.

The Appeal Board further held that the operation of the reactor would not have a significant impact on the environment and therefore a NEPA environmental statement was not required.

In two important respects, however, the decision of the Appeal Board indicated, in petitioners' opinion, a considerable potential environmental effect. First, as pointed out in Judge Oakes' dissenting opinion in the Court of Appeals, the Appeal Board did not consider it desirable to use the limits for permissible radiation doses under normal operations for evaluating the effects of a postulated accident in a research reactor "inasmuch as they are unduly restrictive for that purpose". Second, the Appeal Board and Licensing Board found it necessary to impose numerous conditions in order to provide reasonable assurance that the public health and safety would not be compromised by willful damage or destruction and otherwise to limit radioactive releases from the reactor. Among these conditions are limitations on the access to keys; alarm systems for the reactor control room, the outer reactor control room, the outer reactor room and the reactor itself; an hourly guard inspection of the reactor control room and outer reactor room, facilitated by a wide-angle viewing system in each room; sealing of the truck door in the parking area during operation of the reactor; amendment of Columbia's emergency plans to assure compliance with Appendix E,

10 CFR Part 50; and measures for reducing the discharge of radioactive gas from the reactor.

By order of July 28, 1972, the Appeal Board denied the petitioners' petition for reconsideration. Thereafter, a petition for review was filed with the Court of Appeals for the Second Circuit. Jurisdiction to review the final order of the Commission was conferred on the Court of Appeals by 28 U.S.C. Section 2342. By judgment entered July 5, 1973, the Court of Appeals denied the petition. Although the Commission is authorized, by virtue of the Appeal Board's decision and the judgment of the Court of Appeals, to issue an operating license for the Columbia reactor, petitioners are not aware that such a license has yet been issued.

Copies of the opinions and orders of the Court of Appeals and the decisions and orders of the Atomic Safety and Licensing Board and the Atomic Safety and Licensing Appeal Board are annexed hereto.

REASONS FOR GRANTING THE WRIT

I.

A federal question of general and continuing importance has been decided in a manner which appears to conflict with applicable decisions of this Court.

Triga reactors and other research reactors are in wide-spread use in the United States and may be used even more widely in the future. They have not been operated, however, in densely populated cities. The continuing lack of any general accident safety standards is a matter of

great general concern, particularly for densely populated urban areas. Petitioners urge that such standards should have been established by rule-making proceedings prior to the granting of an operating license herein. The Court of Appeals, with one judge dissenting, held that the decision whether to conduct rule-making rather than adjudicatory proceedings was for the Commission to make.

This Court and various justices thereof have indicated in the past that agencies should use their rule-making power as much as possible to formulate rules of general application. Thus, in *SEC v. Chenery Corp.*, 332 U.S. 194 (1947), the Court stated in part at 202:

> "Since the Commission, unlike a court, does have the ability to make new law prospectively through the exercise of its rule-making powers, it has less reason to rely upon *ad hoc* adjudication to formulate new standards of conduct within the framework of the Holding Company Act. The function of filling in the interstices of the Act should be performed, as much as possible, through this quasi-legislative promulgation of rules to be applied in the future."

In *NLRB v. Wyman-Gordon Co.*, 394 U.S. 759 (1969) the plurality opinion stated in part as follows at 764-65:

> "The rule-making provisions of that Act, which the Board would avoid, were designed to assure fairness and mature consideration of rules of general application. See H.R. Rep. No. 1980, 79th Cong., 2d Sess., 21-26 (1946); S. Rep. No. 752, 79th Cong., 1st Sess., 13-16 (1945). They may not

> be avoided by the process of making rules in the course of adjudicatory proceedings. There is no warrant in law for the Board to replace the statutory scheme with a rule-making procedure of its own invention. Apart from the fact that the device fashioned by the Board does not comply with statutory command, it obviously falls short of the substance of the requirements of the Administrative Procedure Act. The 'rule' created in *Excelsior* was not published in the Federal Register, which is the statutory and accepted means of giving notice of a rule as adopted; only selected organizations were given notice of the 'hearing', whereas notice in the Federal Register would have been general in character; under the Administrative Procedure Act, the terms or substance of the rule would have to be stated in the notice of hearing, and all interested parties would have an opportunity to participate in the rule making."

Douglas, J., dissenting in the same case, stated in part as follows at 777-78:

> "The rule-making procedure performs important functions. It gives notice to an entire segment of society of those controls or regimentation that is forthcoming. It gives an opportunity for persons affected to be heard.
>
> * * *
>
> . . . Agencies discover that they are not always repositories of ultimate wisdom; they learn from

the suggestions of outsiders and often benefit from that advice. See H. Friendly, The Federal Administrative Agencies 45 (1962).

This is a healthy process that helps make a society viable. The multiplication of agencies and their growing power make them more and more remote from the people affected by what they do and make more likely the arbitrary exercise of their powers. Public airing of problems through rule making makes the bureaucracy more responsive to public needs and is an important brake on the growth of absolutism in the regime that now governs all of us."

In his dissenting opinion in the case, Harlan, J. stated part as follows at 781:

"One cannot always have the best of both worlds. Either the rule-making provisions are to be enforced or they are not. Before the Board may be permitted to adopt a rule that so significantly alters pre-existing labor-management understandings, it must be required to conduct a satisfactory rule-making proceeding so that it will have the benefit of wide-ranging argument before it enacts its proposed solution to an important problem."

If rule-making provisions are to be enforced at all, hey should be enforced in this case. Many aspects of the ase, brought out in Judge Oakes' dissenting opinion in the Court of Appeals, point to the necessity here of general

objective rules formulated by rule-making. Among these are: that the independent Atomic Safety and Licensing Board in its Initial Decision denied authoriziation for an operating license in part because of the lack of objective accident safety standards; that the regulatory staff of the Commission has shifted the basis of its safety evaluation of accident conditions from one Triga case to another (in such cases fission products release fractions postulated for purposes of safety calculation have ranged from 10 parts per million to 28,000 parts per million); that in reversing the Licensing Board's denial of authorization, the Appeal Board relied on safety tests conducted by the most interested party, the reactor manufacturer; that notwithstanding its reversal of the Licensing Board, the Appeal Board strongly recommend the formulation of safety standards; and that the three- member Appeal Board included two high-ranking staff members of the Commission, a body which is charged with the dual duty of passing on licenses on the one hand and promoting the use of atomic power on the other, and which has agreed to provide substantial funds for the operation of the reactor.

On the other hand, this Court also has outlined certain circumstances in which rule-making may not be required. Thus, in the *Chenery* case, *supra*, relied on by the Court of Appeals, the Court stated at 332 U.S. 202-03:

> "In other words, problems may arise in a case which the administrative agency could not reasonably foresee, problems which must be solved despite the absence of a relevant general rule. Or the agency may not have had sufficient experience with a particular problem to warrant rigidifying its tentative judgment into a hard and fast rule. Or the

> problem may be so specialized and varying in nature as to be impossible of capture within the boundaries of a general rule. In those situations, the agency must retain power to deal with the problems on a case-to-case basis if the administrative process is to be effective. There is thus a very definite place for the case-by-case evolution of statutory standards. And the choice made between proceeding by general rule or by individual, *ad hoc* litigation is one that lies primarily in the informed discretion of the administrative agency. See *Columbia Broadcasting System v. United States*, 316 U.S. 407, 421."

None of the particular circumstances cited above which might favor *ad hoc* adjudication apply in this case. Indeed, both the Licensing Board and Appeal Board recognized that there should be general objective standards. And nowhere are such standards more important than in the case of a reactor located in a densely populated urban area, indeed in an area far more densely populated than any other in the United States in which an operating reactor is situated.

II.

The decision below conflicts in an important respect with decisions of other Courts of Appeals concerning the scope of the National Environmental Policy Act of 1969 and otherwise significantly restricts the scope of such Act.

The National Environmental Policy Act of 1969 requires an environmental statement in the case of "major Federal actions significantly affecting the quality of the human environment" 42 U.S.C. Section 4332(2)(C).

The majority in the Court below held that the Appeal Board's decision that an environmental impact statement was not necessary was not arbitrary and capricious. The dissenting judge, however, found that such finding was arbitrary and capricious. Both the majority and dissent applied the "arbitrary, capricious" standard of review in accordance with the prior decision of the Court below in *Hanly v. Kleindienst*, 471 F.2d 823, 829 (2nd Cir. 1972), cert. den., 412 U.S. 908 (1973). Petitioners believe, first, that a broader standard of review should have been applied, in accordance with decisions in other Circuits. In *Save Our Ten Acres v. Kreger*, 472 F.2d 463 (5th Cir. 1973), the Court held that the proper standard of judicial review of an agency's threshold determination not to file an environmental impact statement was not the narrower arbitrary capricious standard but a more relaxed rule of reasonableness. The Court stated at 465-66:

> ". . . In support of its argument that the arbitrary or capricious standard should govern, the agency relies on the well-settled proposition that, in the absence of fraud, administrative findings of fact are conclusive if supported by any substantial record evidence. However, this usual fact determination review rule ought not be applied to test the basic jurisdiction-type conclusion involved here. NEPA was intended not only to insure that the appropriate responsible official considered the environmental effects of the project, but also to provide Congress (and others receiving such recommendation or proposal) with a sound basis for evaluating the environmental aspects of the particular project or program. The spirit of the Act

> would die aborning if a facile, ex parte decision that the project was minor or did not significantly affect the environment were too well shielded from impartial review. Every such decision pretermits all consideration of that which Congress has directed be considered 'to the fullest extent possible.' The primary decision to give or bypass the consideration required by the Act must be subject to inspection under a more searching standard."

Accord: *Hiram Clarke Civic Club, Inc. v. Lynn*, 476 F.2d 421 (5th Cir. 1973). The Court in *Save Our Ten Acres, supra*, noted that other Circuits had enunciated a more strict standard than arbitrariness to determine whether an agency had complied with the NEPA requirements in cases dealing with issues other than an agency's determination not to file a statement. Thus, in *Ely v. Velde*, 451 F.2d 1130 (4th Cir. 1971), the Court stated at 1139:

> "With regard to NEPA, the statutory requirement of a 'detailed statement . . . on the environmental impact of the proposed action' places a heavy burden on the LEAA."

In *Natural Resources Defense Council v. Morton*, 458 F.2d 827, 834 (D.C. Cir. 1972) the Court stated that "a rule of reason is implicit in this aspect of the law."

Whether the proper standard of review is a rule of reasonableness or the arbitrary, capricious standard, an environmental impact statement should have been prepared in this case. The guidelines issued by the Council on Environmental Quality, the agency charged, in part, with implementing the Act, provide in part at 36 F.R.

7724 that "if there is potential that the environment may be significantly affected, the statement is to be prepared. Proposed actions, the environmental impact of which is likely to be highly controversial, should be covered in all cases."

The evidence at the hearings more than demonstrated a sufficient risk of radiation exposure to the public to require the conclusion that there was "potential that the environment may be significantly affected" and that the environmental impact of the Columbia reactor was "likely to be highly controversial". Two expert witnesses, with long experience in the field of nuclear energy, testified for petitioners and both concluded, in detailed presentations, that the reactor presented a risk to the public. If such testimony cannot satisfy the tests laid down by the Council on Environmental Quality, it is doubtful that a citizen, particularly one of limited resources, ever could compel an agency to produce an environmental impact statement.

Judge Oakes in his dissenting opinion expressed the view that enough potential environmental effect was demonstrated to require the preparation of an environmental impact statement. He stated that "the effect of the majority's decision is to give the agencies a loophole big enough to make NEPA meaningless". The petitioners submit that it is very important that this should not happen.

CONCLUSION

For these reasons, a writ of certiorari should issue to review the judgment and opinion of the Second Circuit.

Respectfully submitted,

s/ JOHN G. LIPSETT
Attorney for Petitioners

OPINION OF THE COURT

UNITED STATES COURT OF APPEALS

FOR THE SECOND CIRCUIT

No. 524—September Term, 1972.

(Argued March 12, 1973 Decided July 5, 1973.)

Docket No. 72-2093

MORNINGSIDE RENEWAL COUNCIL, INC. and
RIVERSIDE DEMOCRATS, INC.,

Petitioners,

v.

UNITED STATES ATOMIC ENERGY COMMISSION and
UNITED STATES OF AMERICA,

Respondents,

TRUSTEES OF COLUMBIA UNIVERSITY in the City of New York,

Intervenor.

Before:

HAYS, MULLIGAN and OAKES,

Circuit Judges.

Petition to review an order of the Atomic Energy Commission authorizing the Commission's Director of Regulation to issue a license to the Trustees of Columbia University to operate a Triga Mark II nuclear reactor located on the Columbia University campus at 120th Street and Amsterdam Avenue in New York City.

Petition denied.

JOHN G. LIPSETT, New York, New York, *for Petitioners.*

JOHN CHO (Martin R. Hoffmann, General Counsel, Jerome Nelson, Solicitor, U.S. Atomic Energy Commission, Washington, D.C., Kent Frizzell, Assistant Attorney General, Edmund B. Clark and Peter R. Steenland, Attorneys, U.S. Department of Justice, Washington, D.C., on the brief), *for Respondent.*

EDWARD A. GROOBERT, Washington, D.C. (John Wheeler, Thacher, Proffit & Wood, New York, New York, Bennett Boskey, Volpe, Boskey & Lyons, Washington, D.C., on the brief), *for Intervenor.*

HAYS, *Circuit Judge:*

I. *Introduction*

This action seeks review of an order of the Atomic Energy Commission authorizing the Commission's Director of Regulation to issue a license to the Trustees of Columbia University to operate a Triga Mark II nuclear reactor located at 120th Street and Amsterdam Avenue in New York City. The reactor in question, which has already been built, will be used for the training of nuclear engineering students and for research and it can also be used to produce isotopes for medical research. It was constructed in a building on the Columbia campus following a 1963 Commission proceeding authorizing its construction. The petitioners herein did not participate in that proceeding and no appeal was taken from the Commission's decision.

The order at issue in this appeal consists of a decision of the Atomic Safety and Licensing Appeal Board dated May 18, 1972, 2 CCH *Atomic Energy Law Rep.* ¶ 11,595, and an order of the same Board, dated July 28, 1972, denying a petition for reconsideration. The decision and order reversed a prior Initial Decision of the Atomic Safety and Licensing Board which denied authorization to operate the reactor. The parties to the proceeding before the Commission were two proponents of the operating license, Columbia, the applicant for the license, and the Regulatory Staff of the Commission, and three opponents of the license, the two petitioners herein, Morningside Renewal Council, Inc. and Riverside Democrats, Inc., and an individual intervenor who is not involved in this appeal. The members of the Appeal Board whose decision is being challenged are Dr. John H. Buck, a nuclear physicist, Dr. Lawrence R. Quarles, the Dean of the School of Engineering and Applied Science of the University of Virginia and Algie A. Wells, an attorney.

This action presents us with several issues for review: First, whether the record before the Appeal Board, acting for the Commission, contains sufficient evidence to support its major findings that (1) the operation of the reactor will not be inimical to public health and safety, and (2) the issuance of the license does not constitute a "major federal action significantly affecting the quality of the human environment" requiring a detailed environmental statement to be issued under section 102(c) of the National Environmental Policy Act of 1969. Second, whether the Appeal Board erred in failing to implement certain rulings of the Licensing Board before it passed upon the application for authorization, whether the Appeal Board was justified in conducting additional evidentiary hearings in this proceeding and whether those hearings should have been held in New York City rather

than in Washington, D.C. Finding substantial evidence in the record to support the Appeal Board's conclusions and noting no error in its procedural determinations, we reject the contentions of the petitioners, deny their petition for review and uphold the decision and order of the Appeal Board.

II. *The Factual Background*

In 1963, Columbia sought and received a permit to construct the research reactor involved in this proceeding. The University acted pursuant to the provisions of the Atomic Energy Act, 42 U.S.C. §2011 et seq., which provides for a two-stage procedure for the licensing of nuclear reactors. Under the Act, applications for *construction* permits shall be granted "if the application is otherwise acceptable to the Commission," whereas licenses to *operate* the reactors shall be issued by the Commission

> "Upon finding that the facility authorized has been constructed and will operate in conformity with the application as amended and in conformity with the provisions of this chapter and of the rules and regulations of the Commission, and in the absence of any good cause being shown to the Commission why the granting of a license would not be in accordance with the provisions of this chapter . . . ."

42 U.S.C. §2235.

In dealing with licenses for reactors to be used for research and development and for medical therapy,

> "[t]he Commission is directed to impose only such minimum amount of regulation of the licensee as the Commission finds will permit the Commission to fulfill its obligations under this chapter to promote the common

defense and security and to protect the health and safety of the public and will permit the conduct of widespread and diverse research and development."

2 U.S.C. §2134(c).

The permit to build the Triga reactor was issued to Columbia after a full safety review by the Commission's Regulatory Staff and after a Federal Register notice had been published announcing the opportunity for a public hearing on the issue. No one sought such a hearing and no appeal was taken from the Commission's decision. The reactor was then constructed in a building on the Columbia campus.

In February of 1967, Columbia University applied for a license to operate the research reactor. One year later, the Commission's Regulatory Staff issued a Safety Evaluation which concluded that the reactor unit could be operated safely. The Commission thereupon announced its intention to issue the operating license and published a Federal Register notice inviting petitions to intervene from those whose interests might be affected by the issuance of the license. Applications were received from petitioners and one other person.

After the passage of more than one year (a period which included a delay requested by Columbia) the Commission issued a further Federal Register notice providing for a hearing before the Licensing Board and admitting petitioners as parties to the proceedings. The hearing was designed with particular emphasis on the issue of whether there was reasonable assurance that the reactor could be operated without endangering the public health and safety.

At the hearings, conducted in New York City in November, 1969 and July, 1970, testimony was presented by over twenty witnesses and resulted in more than 1,500 pages of transcript. On April 6, 1971, the Licensing Board issued

its Initial Decision denying Columbia an operating license. Although the Board specifically found that in normal use the reactor could be operated safely without endangering the health and safety of the public and that the issuance of the license would not be inimical to the common defense and security, it concluded that it could not authorize the issuance of the license because of the absence of "applicable substantive criteria of the Commission and of convincing objective standards of the Regulatory Staff" dealing with the type of hypothetical accidents which are postulated for the purpose of determining the safety of particular reactors. In addition to this lack of standards, the Licensing Board noted that there were certain discrepancies in the experimental data submitted to it to be used for assessing the effects of the hypothetical accidents. The Board concluded that it had to "decline answering the question of whether the health and safety of the public would be endangered upon the occurrence of a postulated accident" because it considered it "inappropriate to enforce an answer derived from the narrow confines of a single proceeding and its own personal views about the degree to which the health and safety of the public ought to be protected against accident consequences." Suggesting the need for further experimentation as well as objective "accident" criteria relating to the danger to public health and safety, the Licensing Board denied the authorization to issue the operating license.

All of the parties involved filed exceptions to the Board's Initial Decision. The proceedings then went before the Atomic Safety and Licensing Appeal Board to which the Commission has delegated all of its adjudicatory authority. In June of 1971, following a review of the record, the Appeal Board determined that clarification of the record was necessary in certain areas before it could properly decide the issue. Therefore, it ordered that an opportunity

for oral argument be afforded and that additional hearings be held before the Appeal Board directed particularly to three areas: the explanation of the discrepancies in some of the experimental data used to predict the release of radioactive fission products under postulated accident conditions; the criteria to be used to evaluate the predicted effects of the postulated accidents; and an additional explanation from Columbia of its security plans and procedures for preventing unauthorized access to the reactor area.

In May of 1972, after two days of hearings at which twelve technical experts testified, the Appeal Board issued its decision authorizing the issuance of the operating license. Its findings included the following: That when considered in light of the additional experimental data and clarifying information submitted to the Board, the release fission data were "reasonably consistent"; that the accidents hypothesized by the petitioners herein were not credible (thus affirming the Licensing Board's rejection of those hypotheses); that for the purposes of analysis it would adopt the Regulatory Staff's hypothetical accident situation which was more severe than any accident which had occurred during all previous experience with this type of reactor; that regulations as to postulated accidents for research reactors, which the Licensing Board had thought necessary, were not essential because even under the postulated conditions, any release of radioactive fission products would not exceed the guidelines for allowable releases of radioactivity for normal operations; and that therefore there was no danger to the public health and safety from the operation of the reactor. The Appeal Board did, however, impose additional security requirements upon Columbia as a condition of its obtaining the license.

On the basis of the entire record, the Appeal Board concluded that "issuance of the operating license will not be

inimical to the health and safety of the public." After analyzing the potential environmental effect of the reactor, the Board determined that its operation "will not have a significant impact on the environment and, for that reason . . . an environmental statement under the National Environmental Policy Act is not required." On July 28, 1972, the Board denied the petitioners' request for reconsideration of its decision.

III. *The Substantive Claims*

We deny the petition to review and we uphold the decision and order of the Commission's Appeal Board. We have examined the Appeal Board record and decision as well as the Licensing Board's Initial Decision and we find no grounds upon which to base reversal of the final order at issue herein. It is clear from the extensive and thorough record that the Appeal Board carefully considered all aspects of the issues involved in the granting of an operating license for this particular reactor. Since the challenged findings are supported by substantial evidence in the record, it is not within the competence of this court to overrule the Board's determination. See *Scenic Hudson Preservation Conference* v. *Federal Power Comm'n*, 453 F.2d 463, 468 (2d Cir. 1971), cert. denied, 407 U.S. 926 (1972).

The Board's decision that an environmental impact statement pursuant to the National Environmental Policy Act of 1969 was not necessary was based upon its threshold finding that the licensing involved in this case was not a "major federal action significantly affecting the quality of the human environment." This finding too was supported by substantial evidence in the record and the Board's decision was clearly not arbitrary and capricious. On this issue, the agency has the authority to make its own threshold determination. See *Hanly* v. *Kleindienst*, 471 F.2d 823

(2d Cir. 1972); *Hanly* v. *Mitchell*, 460 F. 2d 640, 644 (2d Cir.), cert. denied sub nom. *Hanly* v. *Kleindienst*, 409 U.S. 990 (1972). Moreover, in this instance, there was a reviewable environmental record made with the participation of the public so that the finding that no NEPA statement was necessary was made by the Board with full knowledge of all of the environmental questions raised by the petitioners. Here the underlying issue was "safety" and the inquiry into that area was detailed and entirely adequate.

IV. *The Procedural Claims*

Petitioners contend that rule-making rather than adjudicatory proceedings should have been conducted in this case. However, that decision is one for the agency to make for that is where the expertise which is necessary to make such a determination lies. See *SEC* v. *Chenery Corp.*, 332 U.S. 194, 203 (1947); *N.L.R.B.* v. *A.P.W. Products Co.*, 316 F.2d 899, 905-6 (2d Cir. 1963). Absence of general regulations and objective criteria regarding postulated accident situations, which the Licensing Board thought necessary before granting authorization to issue the license, presents no bar to the issuance of the license in this case since the Board's decision is amply supported by a full record. Just as an agency may reverse its hearing examiner, the Appeal Board, acting as the Commission itself in this case, may reverse the Licensing Board, especially on questions of policy and discretion.

The Appeal Board's actions were well within its powers when it conducted limited evidentiary hearings and ordered them held in Washington, D.C. as the Board said:

> "Holding of a proceeding of this type is clearly within the Appeal Board's jurisdiction. The Administrative Procedure Act, which is specifically made applicable to proceedings of this type by Section 181 of the

> Atomic Energy Act of 1954, as amended, 42 U.S.C. §2231, contemplates that when an initial decision is subject to review within an agency, the reviewing body may 'restrict its decisions to questions of law, or to the question of whether the findings are supported by substantial evidence or the weight of evidence . . . [or] it may make entirely new findings either upon the record or upon new evidence which it takes.' . . . . The authority vested in the Appeal Board includes the entire authority and review functions which would otherwise be exercised by the Commission in a given case. It follows that the Appeal Board has the Commission's authority, as contemplated under the Administrative Procedure Act, to take evidence incident to its appellate review . . . ." (footnote omitted.)

10 C.F.R. §2.703(b) states that the time and place of hearing will be fixed "with due regard for the convenience of the parties or their representatives, the nature of the proceeding, and the public interest." This is obviously a guideline to the agency's discretionary authority. The Appeal Board did not abuse its discretion in determining that Washington, D.C. was the appropriate place to hold the additional hearings, especially in light of the fact that petitioner's only witness was from Pittsburgh, Pennsylvania and several of the witnesses representing the Commission's Regulatory Staff were from the Washington, D.C. area. Other witnesses were from Pennsylvania and California while only two were from New York.

Petition denied.

OAKES, *Circuit Judge* (dissenting):

I respectfully dissent.

While there may have been an overreaction on the part of some to the threats from this "little" reactor, there are two points which seem to me to require reversal—the absence of AEC safety standards relating to teaching or research reactors and the absence of an Environmental Impact Statement (EIS) under NEPA.

Regarding safety standards, the AEC Safety and Licensing Board itself denied a license because it would not answer questions about the reactor's possible effect on public health and safety absent applicable substantive criteria and convincing objective standards concerning evaluation of possible nuclear accidents. 2 CCH Atom. En. L. Rep. ¶11,595 (May 18, 1972). One must certainly agree with the Safety and Licensing Board that the "fission products release fraction under postulated accident conditions for such a standard product as a Triga reactor ought to be a matter of proven determination and unquestionable validity." Moreover, apparently the regulatory staff of AEC has shifted the basis of its safety evaluation of accident conditions from one Triga case to another. The Appeal Board did not really disagree with the need for standard regulations—in fact it strongly recommended adoption of them—but went ahead and granted a license here anyway. While the petitioners' postulated accidents seem quite remote to me,[1] it may be that there is some other postulated

1 Petitioners' expert postulated three hypothetical accidents: (1) sabotage, causing the loss of shielding water plus rupturing of one of several fuel elements; (2) any circumstance causing a fuel element to reach 1000° centigrade, followed by a rupture of the fuel elements in air; (3) an aircraft accident.

Even through sabotage at Columbia University is not exactly an unheard-of-event, there was substantial evidence that the juxtaposition of so many relatively sophisticated operations would apparently be required to make the sabotage effective that the "Mission Impossible"

accident that should be taken into account that was not in evidence in this proceeding, and a rule-making procedure would seem to be the preferable way to develop this. Through a rule-making procedure the Commission may "educate itself," *cf. Lewis-Mota* v. *Secretary of Labor*, 469 F.2d 478, 482 (2d Cir. 1972); *Texaco, Inc.* v. *FPC*, 412 F.2d 740, 744 (3rd Cir. 1969), and formulate all of the necessary standards and requirements based upon appropriate scientific data, and that would make it easier for everyone to know the Commission's regulations on an issue of substantial importance; apparently Triga and other teaching reactors are widely used and may be even more widely used in the future. Courts, I believe, have the power to remand for rule-making proceedings in cases of this type, where the agency obviously should have formulated a generalized policy but has failed to do so. *Cf. Bell Aerospace Co. Division of Textron, Inc.* v. *NLRB*, 475 F.2d 485, 494-96 (2d Cir. 1973) (Friendly, C.J.) (change in Labor Board's "managerial employees" exception to coverage of National Labor Relations Act made through adjudication remanded to Board for rule-making proceeding).

A rule-making proceeding here is particularly appropriate for another reason—it might serve as a measure of protection against the agency's own interests' influencing its disposition of this particular case. I have already mentioned the Commission's variable "standards" for licensing Triga reactors.

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team would be required to effectuate it. There is some evidence to indicate that 1000° centigrade cannot be attained in a Triga. While I cannot agree with the AEC view that it is a one in 10 billion chance that an airplane would accidentally strike the Columbia Triga, because I don't think such an event is susceptible to meaningful mathematical computation, there is some evidence, however, that it would take a vertically dropping plane penetrating four feet of earth, two feet of reinforced concrete and a steel beam crane at a specific time when fission product accumulation was high to create a possibility of serious radioactive release.

I continue[2] to express concern that the AEC is charged with the dual duty of passing on licenses on the one hand but promoting the use of atomic power on the other. The AEC also has an interest in seeing this reactor licensed to promote its Nuclear Education Training Program; to this end it has entered into an agreement with Columbia to provide post-license funds for the operation of the reactor and to waive charges for Commission-owned special nuclear material involved in its operation. My concern is so much the greater where, as here, the independent Safety and Licensing Board has denied the license, but was overruled by the three-member Appeal Board, consisting of two AEC staff members. Moreover, the safety tests relied upon by the Appeal Board here were conducted by the most interested party, the manufacturer of the reactor, following an exchange of correspondence between "Ralph" (Mr. Peters of Gulf Oil) and "Pete" (Dr. Peter A. Morris, Director of the AEC Division of Reactor Licensing) in which Gulf advised the Commission that "We hope to have you or members of your staff participate fully in these experiments so that they will be deemed to have been done 'under the auspices of the Regulatory Staff.'" Following this Dr. Morris advised Gulf that he would attend the tests "as an observer." In holding that the FPC could not adopt as its own an EIS drawn up by a state agency-

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2 *See Developments in Environmental Law*, 3 E.L.R. 50001, 50008 (1973):

> . . . for the most part the agencies which must do the "full good faith" balancing of economic and social costs against environmental costs are generally structured to be advocates for economic expansion. As long as agencies are left to do the balancing, and as long as they have a *dual mandate* of environmental protection and economic development in their particular field—for example, power growth for the FPC, nuclear development for the AEC, or flood containment for the Army Corps of Engineers—is not the environment *bound* to come out on the short end?
>
> (Emphasis original.)

applicant for a power license this court said in *Greene County Planning Board* v. *FPC*, 455 F.2d 412, 420 (2d Cir.), *cert. denied*, 409 U.S. 849 (1972): "*The danger of this procedure* [the one followed by the FPC], *and* [*its*] *obvious shortcoming, is the potential, if not likelihood, that the applicant's statement will be based upon self-serving assumptions.*" (Emphasis supplied.) While *Greene County* dealt with the requirements of NEPA, I cannot believe that the AEC should be held to any lesser standard in its safety licensing procedures. The Commission should not be permitted to abdicate its responsibility for ensuring public safety to a party with a large financial stake in the outcome of the tests it is conducting. One good way to insure it does not do so is to require it to draw up safety standards generally applicable to all teaching reactors, not just to the one in this particular case.

With regard to the necessity for the preparation and filing of an EIS under NEPA, 42 U.S.C. §§ 4321-47 (1970), the threshold question is whether, or to what extent, the agency's own determination that a given agency action is not a "major Federal action significantly affecting the quality of the human environment," 42 U.S.C. § 4332(2)(c), is binding upon us. This court has previously held in *Hanly* v. *Kleindienst*, 471 F.2d 823, 829 (2d Cir. 1972), that "the appropriate criterion . . . is the 'arbitrary, capricious' standard established by the Administrative Procedure Act, since the meaning of the term 'significantly' as used in § 102(2)(C) of NEPA can be isolated as a question of law." The two relevant factors for consideration, *Hanly* v. *Kleindienst* went on to say, 471 F.2d at 830-31, were: "(1) the extent to which the action will cause adverse environmental effects in excess of those created by existing uses in the area affected by it, and (2) the absolute quantitative adverse environmental effects of the action itself, including the cumulative harm that results from its

contribution to existing adverse conditions or uses in the affected area." I do not think that it would be inconsistent with, or stretching, this language to say that the true first test is the extent to which the action *has the potential of causing* adverse environmental effects. *Cf. Scientists Institute* v. *AEC,* 41 U.S.L.W. 2674 (D.C. Cir., June 12, 1973) (NEPA requires EIS for AEC's breeder reactor program even though program is presently only in research and development stage in part because of potential *future* environmental effects of program). For *Hanly* articulated a threshold test, and if its questions are answered in the negative then an EIS, through which the full scope of the potential environmental effects of a "major Federal action" are actually brought out, would not be required. If the *potential* is substantial then the impact statement must be forthcoming; NEPA speaks of making an initial determination "as to whether the proposal *would have* a significant effect," not whether it "does have" such an effect.

By upholding the AEC's determination that there would not be any such significant potential effect here, the majority apparently adopts the "rational basis" standard of review rejected by the *Hanly* court. *See* 471 F.2d at 829. The effect of the majority's decision is to give the agencies a loophole big enough to make NEPA meaningless, or in Judge Skelly Wright's words a "paper tiger." *See Calvert Cliffs' Coordinating Committee, Inc.* v. *AEC,* 449 F.2d 1109, 1114 (D.C. Cir. 1971). The potential effect of a nuclear accident on the environment of New York City would be pretty substantial, if not catastrophic, and even though the Safety and Licensing Board and the Appeal Board did not accept the petitioners' postulated accidents, they each considered safety standards that involved hypothetical "accidents." The fact that the former found there were no generalized standards and that the latter found that under the regulatory staff's postulated accident situa-

tion "the health and safety of the public will not be en-
dangered" do not take away from the proposition that in
the event of an accident the damage would be great. The
fact that the Appeal Board in its decision did "not consider
it desirable to use the standards of 10 CFR Part 20 for
evaluating the effects of a postulated accident in a research
reactor" even while it "strongly recommend[ed] that spe-
cific standards for the evaluation of an accident situation
in a research reactor should be formulated" in and of itself
indicates to me that there is here involved a sufficient
"potential" of environmental effect to require an impact
statement.

Moreover, ten pages of the Appeal Board decision is
devoted to answering the testimony of appellant's expert,
a Dr. Sternglass, relative to infant mortality rates in the
vicinity of Triga reactors at Penn State College, the Uni-
versity of Illinois and in San Diego where the Gulf-Gen-
eral Atomic Corporation has its plant. It may be that Dr.
Sternglass's determinations do not have any "valid scien-
tific foundation," as the Appeal Board held. (I suppose
that many thought that Rachel Carson's thoughts and fears
expressed in *Silent Spring* had none either.) But does that
mean that there is not a potential environmental effect
that at least bears examination through the preparation
of an EIS? I should suppose that even though this is a
"little" research reactor its potential environmental impact
is at least as significant as that of a federal jail, *Hanly* v.
Kleindienst, supra, or the abandonment of a 1.8 mile stretch
of railroad, *City of New York* v. *United States,* 337 F.
Supp. 150, 158-60 (E.D.N.Y. 1972) (three-judge court).
See generally Developments in Environmental Law, 3
E.L.R. 50001, 50005 (1973). The finding here by the Com-
mission that no impact statement is required in my view
was arbitrary and capricious.

Were an impact statement to be required the AEC could ot argue that the Appeal Board's decision amounted to ne. This is so because (A) the Board relied quite heavily n data furnished by the manufacturer contrary to the equirements of *Greene County Planning Board* v. *FPC*, upra, and because (B) there has not been consultation ith other concerned federal agencies such as EPA or IEW, as required by 42 U.S.C. § 4332(C).

Because I think that the AEC did not meet the require- ients of its own Act in reversing the Safety and Licensing Board and because I think enough potential environmental ffect was demonstrated to require the preparation of an EIS, I dissent.

ORDER OF UNITED STATES COURT OF APPEALS

UNITED STATES COURT OF APPEALS
SECOND CIRCUIT

At a stated term of the United States Court of Appeals in and for the Second Circuit held at the United States Court House, in the City of New York on the fourth day of October, one thousand nine hundred and seventy-three.

Present:

HON. PAUL R. HAYS,

HON. WILLIAM H. MULLIGAN,

HON. JAMES L. OAKES,

Circuit Judges.

Morningside Renewal Council, Inc. and Riverside Democrats, Inc.,

Petitioners-Appellants,

v.

Docket No. 72-2093

United States Atomic Energy Commission and United States of America,

Respondents-Appellees,

Trustees of Columbia University of the City of New York,

Intervenor.

Order of United States Court of Appeals

A petition for a rehearing having been filed herein by counsel for the appellant,

Upon consideration thereof, it is

Ordered that said petition be and it hereby is denied.

s/ A. Daniel Fusaro
Clerk

UNITED STATES COURT OF APPEALS
SECOND CIRCUIT

At a stated term of the United States Court of Appeals, in and for the Second Circuit, held at the United States Court House, in the City of New York, on the fourth day of October, one thousand nine hundred and seventy-three.

Morningside Renewal Council, Inc. and Riverside Democrats, Inc.,

Petitioners-Appellants,

v.

Docket No. 72-2093

United States Atomic Energy Commission and United States of America,

Respondents-Appellees.

Order of United States Court of Appeals

Trustees of Columbia University of the City of New York,

Intervenor.

A petition for a rehearing containing a suggestion that the action be reheard in banc having been filed herein by counsel for the appellant, a poll of the judges in regular active service having been taken at the request of such a judge, and there being no majority in favor thereof,

Upon consideration thereof, it is

Ordered that said petition be and it hereby is DENIED.

Judges Mansfield, Oakes and Timbers dissent.

s/ Irving R. Kaufman
Irving R. Kaufman
Chief Judge

INITIAL DECISION OF ATOMIC SAFETY AND LICENSING BOARD

UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

In the Matter of

TRUSTEES OF COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Docket No. 50-208

ATOMIC SAFETY AND LICENSING BOARD
Eugene Greuling
Hood Worthington
Valentine B. Deale, Chairman

PREFATORY NOTE

The Licensing Board acknowledges that much time has elapsed between the beginning of the hearing and the Initial Decision and believes that a word or two of explanation is in order.

The major factor holding up the Initial Decision was the unforeseen circumstance of competing heavy demands on the time of two of the Licensing Board's members, particularly its Chairman, arising out of their commitments in conducting other nuclear reactor licensing proceedings. One of these proceedings, a contested one involving two power reactor operating licenses, practically preempted the time of the Chairman for several months. Additionally,

illness of one of its members reduced the Licensing Board's capacity to move ahead at normal pace.

Apart from those circumstances, the present proceeding raised certain troublesome problems for the Licensing Board which added to the lapsed time between the first hearing and the Initial Decision. The problems, discussed in the Initial Decision, occasioned extended study following the first hearing, a certification to the Appeal Board and a request to the parties for additional data, a second hearing, and thereafter further extended study in the course of preparing the Initial Decision.

The foregoing considerations in no way pertain to the deferral of the proceeding prior to the hearing for 12-½ months at the applicant's request.

E. G.
H. W.
V.B.D.

April 6, 1971

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OF

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LICENSING BOARD'S POSITION WITH RESPECT TO –

Applicant's Proposed Findings and Conclusions A

Regulatory Staff's Proposed Findings of Fact and Conclusions of Law I

Findings and Conclusions of Mrs. Mary Hays Weik (

Proposed Findings of Fact of Morningside Renewal Council, Inc. and Riverside Democrats, Inc. I

Proposed Conclusions of Law of Morningside Renewal Council, Inc. and Riverside Democrats, Inc. I

Initial Decision

UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

In the Matter of

TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK

Docket No. 50-208

INITIAL DECISION

APPEARANCES IN BEHALF OF PARTIES

Bennett Boskey, Esq., in behalf of Trustees of Columbia University in the City of New York, Applicant;

Troy B. Conner, Jr., Esq., Neil J. Newman, Esq., and Thomas F. Engelhardt, Esq., in behalf of the Regulatory Staff of the United States Atomic Energy Commission;

Mrs. Mary Hays Weik, Intervenor, pro se;

Justus C. Poole in behalf of Morningside Renewal Council, Inc., Intervenor; and

John G. Lipsett, Esq., in behalf of Riverside Democrats, Inc., Intervenor.

PRELIMINARY MATTERS

1. The Trustees of Columbia University in the City of New York (applicant) filed with the Commission an application, dated May 6, 1963, for a permit to construct a

Triga Mark II nuclear reactor on Columbia University's campus in the Morningside Heights area of New York City. Following review by the Commission's regulatory staff of the application and of amendments thereto including responses to inquiries of the regulatory staff, Construction Permit No. CPRR-78 was issued to the applicant on December 30, 1963. By letter amendment of February 3, 1967, to its original application, the applicant sought an operating license and, at that time and later in due course, it furnished to the regulatory staff data relating to the proposed operation of its facility. On March 18, 1968, the Commission gave notice of the proposed issuance of an operating license; its notice was published in the Federal Register on March 26, 1968 (33 F.R. 5021).

2. Among other matters, the notice provided that within 30 days from the date of publication, any person whose interests might be affected by the issuance of the proposed license could file a petition for leave to intervene in accordance with the requirements of the Commission's Rules of Practice. Mrs. Mary Hays Weik, Morningside Renewal Council, Inc. (Morningside) and Riverside Democrats, Inc. (Riverside) sought to intervene in the proceeding. Other expressions of interest were received. The Commission's regulatory staff filed an answer to the three requests to intervene, taking the position it would not object to the granting of intervention. The applicant filed no response. On May 24, 1968, the applicant filed with the Commission a request that the Commission defer consideration of its pending application for an operating license. On June 10, 1969, the applicant requested the Commission to resume consideration of the application.

3. On June 25, 1969, the Commission issued a notice of hearing. This notice, published in the Federal Register on June 28, 1969 (34 F.R. 10011), provided for a public prehearing conference and hearing in New York City, permitted Mrs. Weik, Morningside and Riverside to intervene, defined the issues for consideration at the hearing, and established this Atomic Safety and Licensing Board (Licensing Board) to conduct the proceeding.

4. On July 30, 1969, the Licensing Board, for its own orientation purposes, visited the location of the reactor and surrounding premises. The parties were given notice of this tour by the board and were invited to accompany it on the occasion. Representatives of the applicant and the regulatory staff and intervenor Mrs. Weik did so.

5. On the following day, July 31, the prehearing conference was held. After giving consideration to the earlier application of Riverside for a postponement of the scheduled hearing date and the comments thereon by the other parties, the Licensing Board rescheduled the hearing from August 19, as set out in the notice of hearing, to September 23. The Licensing Board requested the following items, all of which it subsequently received: a consolidated safety analysis report from the applicant and its operating procedures, the regulatory staff's evaluation thereof, financial liability and indemnity information from the regulatory staff, and the views of the parties concerning the relevance in the proceeding of radiological safety factors involved in the transportation of radioactive material to and from the subject facility. In keeping with prehearing conference procedure, the Licensing Board re-identified the issues to be considered by it at the hearing and determined which of the same were in controversy. It

confirmed that pulse mode was well as steady state operation was within the scope of the hearing and noted questions and areas of particular interest to it for development by the parties at the hearing. The Licensing Board also addressed itself to limited appearance requests and procedural matters relating to the conduct of the hearing. The Licensing Board issued a memorandum on August 20, 1969, embracing the prehearing considerations noted herein.

6. By letter of September 8, Riverside requested a further postponement of the hearing. By a request of the same date, the Director Office of Radiation Control, Department of Health, City of New York, also sought a postponement of the hearing. In addition, the Licensing Board determined that there had been inadequate public notice regarding the opportunity afforded interested persons to make a limited appearance (there was nothing on the subject in the initial notice of hearing or later order changing the date of hearing). In view of the foregoing, the Licensing Board on September 12 rescheduled the hearing to begin on November 18, 1969, and saw to it that the official announcement of the new hearing date in the Federal Register included information concerning limited appearances (34 F.R. 14616, September 19, 1969). The hearing then took place in New York City as rescheduled, continuing for three days — November 18, 19, and 20, 1969.

7. There were thirty-two limited appearances pursuant to section 2.715(a) of the Commission's Rules of Practice. This section provides that a person who is not a party may, in the discretion of the presiding officer, be permitted to make a limited appearance by making an oral or written

statement of his position on the issues. The purpose of limited appearances is to enable members of the public who are not parties to the proceeding to bring their views and concerns to the attention of the parties and the Licensing Board so that such views and concerns, though they do not constitute formal evidence, may be given appropriate consideration in the course of the evidentiary hearing.

8. Of the thirty-two persons making limited appearances, thirty indicated opposition to Columbia University operating a reactor on its Morningside Heights campus. Of the opponents six were members or members-elect of federal, state and city legislative bodies representing people living in the immediate area of the reactor or nearby. These political officials were United States Representatives William F. Ryan (20th Cong. Dist., N.Y., represented at the hearing by Mrs. Jean Faust) and Edward I. Koch (17th Cong. Dist., N.Y., represented at the hearing by Peter Bernuth); State Senator Basil A. Paterson, 27th Senatorial District, New York City; State Assemblyman Franz S. Leichter, 69th District, New York City; and New York City Councilmen-elect Carter Burden (4th District — who forwarded his views by telegram) and Eldon R. Clingan (At-large, Manhattan — who forwarded his views by letter).

9. Representatives of four neighborhood organizations asserted the opposition of their organizations to Columbia University's application for an operating license: Mrs. Edith Bach, Social Worker, Midwest Side Neighborhood Health Council; Robert W. Hedges, Chairman, Morningsiders United; Mrs. Naomi Patterson, President,

Parents Association P. S. 36-125 (represented at the hearing by Mrs. Ports); and Miss Marie M. Runyon, Chairman, Morningside Tenants' Committee.

10. Residents of the community, including Columbia University students at graduate level, also spoke as private individuals against the proposed operating license. These persons included Mrs. Mary Boyd (who also presented her views to the Licensing Board by letter), Miss Glenda Cimino, John W. Grifalconi (who supplemented his oral statement with two exhibits), Dr. Janet Karlson, Mrs. Ann Margetson, Stonewall Jackson McMurray, III, Mrs. Pamela Rich, and Miss Deborah Solomon (who supplemented her oral statement with a later letter to the Licensing Board). Melvin Morgulis, Jeff Newman, and Robert Lee Smith also voiced their opposition to the proposed operating license.

11. Others who made known their opposition to the applicant's position by means of a letter or telegram to the Licensing Board were Mrs. Anna M. Bennett, Dr. and Mrs. Michael Bender, Robert M. Ginsberg, George H. Hickerson, Mr. and Mrs. Michael McKeen, Dr. Robert J. Von Gutfeld, and Edward H. Wright.

12. The remaining two persons among the count of those making limited appearances were Miss Mary Ann Sweeney, a third year Columbia University student, and Hanson Blatz, Director, Office of Radiation Control, New York City Department of Health. Miss Sweeney confined her oral statement to telling of the difficulty which she and another person had in gaining entrance to the hearing. Mr. Blatz's prepared statement, which included an explanation of the safety precautions followed in

transporting radioactive material through New York City, concluded that there is no reason for the government of New York City to object to the operation of Columbia University's reactor as planned.

13. Principal contentions of the limited appearers opposing the proposed license are set forth below, together with comments thereon by the Licensing Board:

a. Contention: The community in the vicinity of the reactor site is unwilling to accept the risks, whatever they might be, of having a nuclear reactor in its midst, particularly in the absence of suitable consultation by the applicant with the community and in the absence of compensating benefits to itself. The situation is aggravated by the applicant's record in dealing with the interests of the community and also by the fact that the location of the reactor on the Morningside Heights campus is simply for the convenience of teaching but a dozen or so students.

Comment: The responsibility of the Licensing Board is to adjudicate issues set out in the notice of hearing. Other issues, which may be decisive to other authorities or interests, are beyond the Licensing Board's regard. It has no occasion to determine the sentiment of the neighboring community toward the proposed license or to weigh the benefits or lack thereof which the community may derive from the proposed operation of the reactor. Nor is the proceeding a trial of the applicant's public relations policies and practices toward its neighbors.

b. Contention: The hazard to public health and safety in transporting radioactive material in the City of New York, especially in the area of the reactor site, is enough to preclude justification of licensing the reactor.

Comment: The concern about the possibility of serious accidents in transporting radioactive material in the streets of New York City is irrelevant to the proceeding, not because of the nature of the subject matter but rather because of a division of responsibility between the Atomic Energy Commission and the Department of Transportation. The latter has jurisdiction over the transportation of radioactive materials and over safety regulations with respect thereto; the former does not. As an arm of the Commission, the Licensing Board must confine its determinations to matters within the scope of the Commission's authority. Thus, in the present case, the Licensing Board focuses on radiological health and safety factors bearing upon the operation of the reactor at the reactor site. Nevertheless, for the information of the public, the Licensing Board both permitted and arranged for data to be included in the record bearing upon safety questions and safety measures relating to the transportation of radioactive material to and from the reactor site. Information about the infrequency of such anticipated transportation was also included in the record.

c. Contention: The proceeding itself is weighted in favor of granting the license, as evidenced by the following: (i) AEC's promotional role is in conflict

with its regulatory responsibilities; (ii) earlier AEC permission to build the reactor practically forecloses AEC now from denying an operating license; and (iii) notice to the public about the hearing is inadequate, the Federal Register being a largely unread and generally unobtainable publication.

Comment: This contention attacks the licensing system and implicates the underlying law and regulations. The Congress can act on the statutory basis for the licensing system; the Commission can act on the regulations implementing the governing statutory law; the Licensing Board can act on neither. With respect to (i), the broad political controversy of whether it is desirable to permit an agency at one and the same time to be a promoter and a regulator has persisted through several decades of development in administrative law. The controversy, while an appropriate matter for a legislative body to consider if it so chooses, is clearly beyond the province of the Licensing Board. With respect to (ii), the Initial Decision itself is reply enough. With respect to (iii), the official status of the Federal Register as a legal vehicle of notice, and its circulation, are matters outside the Commission's authority. In addition to notices placed in the Federal Register, the Commission, in accordance with its regular practice, distributed to the news media public announcements of its own regarding the proposed licensing and related hearing matters associated with this proceeding. The participation herein of two citizens associations and an individual as intervenors and of 32 others as limited appearers indicates a degree of effectiveness of the notices undertaken by the Commission.

d. Contention: Operation of the reactor in the Terrace Building involves serious risk of radiological hazards to a densely populated area, including a residential community, both from the planned usage of the reactor and from accident circumstances, including those from external causes.

Comment: The contention relates directly to basic issues in this proceeding which are adjudicated by the Licensing Board in this Initial Decision.

e. Contention: There is little or no knowledge about the effects of adding radioactive pollutants to an already heavily polluted atmosphere. The potential danger from the emission of Argon-41 from the stacks has not been adequately assessed. The AEC standards are not sufficient.

Comment: The AEC standards governing limits of permissible exposure to radiation are based on recommendations which had been developed by the Federal Radiation Council and approved by the President. In the absence of substantial, authoritative data to the contrary, expressions of dissatisfaction with the standards and general allegations aimed at raising doubts about them are not sufficient to move the Licensing Board to seek their re-examination. For further statement and references, see last paragraph beginning on page two, Attachment D.

ADDITIONAL PROCEDURAL AND OTHER CONSIDERATIONS

14. Following the three days of hearing and following the completion of the customary post-hearing filings in the middle of January 1970, the Licensing Board, after extended study of the full record, concluded that it required advice concerning certain AEC regulations and standards and also, additional factual information. Accordingly, on April 6, it certified two questions to the Atomic Safety and Licensing Appeal Board (Appeal Board) and requested the parties to submit specified additional data. The two certified questions were as follows:

> Is the applicant's reactor a "testing facility" according to the defintion at 10 CFR Section 50.2(r)(1)?
>
> If a substantial meltdown of the core with subsequent release of appreciable quantities of fission products is not the type of major accident which should be hypothesized for purposes of site analysis, then what sort of an accident should be hypothesized for such purposes in the present proceeding — wherein a Triga Mark II reactor is proposed to be operated in the midst of a densely populated community?

The additional data requested of the parties pertained to the following: whole body and thyroid dosages at specified locations under hypothesized accident conditions; details of experiments forming the basis of certain calculations of

the applicant bearing upon fission product releases under accident conditions; reports concerning applicant's operation of the reactor at Industrial Reactor Laboratories; AEC records of accidental fission product releases at Triga reactors; public health and safety considerations associated with the location of the applicant's reactor above an old water course and its proximity to the Croton aqueduct system; operating procedures for protecting the reactor against industrial sabotage or damage or destruction as a result of civil disturbance; use of CO_2 instead of air in the reactor's beam tubes; operating procedures for opening and closing the ventilation system; possible new amendments to the applicant's Safety Analysis Report and its operating procedures; underlying supports for emergency procedures; extent of applicant's control, possession or use of unlicensed radioactive material or unlicensed sources of radiation within the vicinity of the reactor site; and proposed amendment to operating license to give specific acknowledgementof brief pulsing to high power peaks.

15. In light of the responses which it received from the Appeal Board and the parties, the Licensing Board by order of June 16 reopened the hearing for limited purposes. At the reopened hearing in New York City on July 10, the Licensing Board received further evidence and arguments from the parties on specific subjects which it had identified in its June 16 order. The submission by the parties of amended proposed findings and conclusions and also of supplemental factual data and comment was completed shortly before the end of September 1970.

Initial Decision

16. During the three days of hearing in November 1969, the applicant's witnesses supporting the authorization of an operating license were: Ralph H. Peters, Manager, Triga Reactor Program, Gulf General Atomic Incorporated; Marvin E. Wyman, Ph.D. (nuclear physics), Chairman, Nuclear Engineering, University of Illinois; Warren F. Goodell, Ph.D. (physics), Vice President for Administration of Columbia University and member of the University's Radiation Safety Committee and its Reactor Safety Committee; William W. Havens, Ph.D. (physics), Director of the Division of Nuclear Science and Engineering of the School of Engineering and Applied Science of Columbia University; and Michael G. Woram, Columbia University's Reactor Supervisor. At the continued hearing on July 10, 1970, Dr. Havens and Messrs. Peters and Woram gave further testimony in behalf of the applicant and Leon J. Lidofsky, Ph.D. (physics), Chairman of Columbia University's Reactor Safety Committee, also testified in support of the proposed operating license.

17. Witnesses for the regulatory staff, which supported the proposed license, gave testimony at both the November 1969 and July 1970 hearing sessions. Those members of the staff providing testimony at the earlier hearing session were Robert J. Schemel, Chief, Operating Reactor Branch No. 1, AEC Division of Reactor Licensing; Thomas P. Flood, Reactor Engineer, Operating Reactor Branch No. 1, AEC Division of Reactor Licensing; Floyd Cantrell, Reactor Inspector, AEC Division of Compliance; Richard B. Chitwood, Chief, Irradiated Fuel Branch, AEC Division of Materials Licensing; and Charles A. Lovejoy, Staff Accountant, Office of the Controller, AEC

(testimony by affidavit upon consent of parties and the Licensing Board). Members of the regulatory staff providing testimony at the July 10, 1970, hearing were Messrs. Schemel, Flood and Cantrell, and also Anthony T. Cardone, Geologist, Site, Environmental and Radiation Safety Group. AEC Division of Reactor Licensing.

18. The three intervenors produced the following witnesses. At the hearings on November 18-20, 1969, Mrs. Mary Hays Weik, a newspaper woman, testified in her own behalf, and at the hearing on July 10, 1970, Mrs. Weik again testified and John W. Grifalconi, a city planner and architect, who had previously made a limited appearance, also testified as a witness in support of Mrs. Weik's general position. Riverside Democrats, Inc., with whom Morningside Renewal Council, Inc. joined in the presentation of, in effect, a single case of opposition to the proposed license, had one witness at each of the hearing sessions, namely, William J. Nicholson, Ph.D. (physics), Assistant Professor of Community Medicine at Mount Sinai School of Medicine, New York City. In addition, there was introduced into the record at the first of the two hearing sessions as part of the case of Riverside Democrats, Inc. (and also of Morningside Renewal Council, Inc. by adoption) the written statement of Martin Sonenberg, M.D., Chief of the Division of Endocrinology of the Sloan-Kettering Institute for Cancer Research.

19. The issues for consideration by the board as prescribed by the Commission in the notice of hearing are:

a. Whether there is reasonable assurance (i) that operation of the reactor at not in excess of 250

kilowatts (thermal) under the conditions and limitations proposed can be conducted without endangering the health and safety of the public, and (ii) that such operation will be conducted in compliance with the rules and regulations of the Commission;

b. Whether the applicant is technically and financially qualified to engage in the activities as authorized by the operating license in accordance with the rules and regulations of the Commission;

c. Whether issuance of the license to operate the facility under the terms and conditions proposed will be inimical to the common defense and security or to the health and safety of the public.

20. At the prehearing conference it was determined that among the parties, including the intervenors, only a part of the three issues were in controversy. The applicant and the regulatory staff on the one hand and the three intervenors on the other hand confined their disagreement to those parts of the first and third issues above (a and c) relating to the health and safety of the public. There was no contest then about the applicant's compliance with the Commission's rules and regulations, about the applicant's technical and financial qualifications, or about the common defense and security issue. However, in their proposed findings and conclusions, Riverside and Morningside contested every issue with the applicant and the regulatory staff except the applicant's financial qualifications. At the prehearing conference, intervenor Mrs. Weik controverted the applicant and the regulatory

staff on the health and safety issues alone; in her proposed findings and conclusions following the November 18-20, 1969 hearings, she also addressed herself to the applicant's financial qualifications.

21. The proceeding is a "contested" one within the meaning of section 2.4(n) of the Commission's Rules of Practice and the Commission's procedures applicable to contested proceedings (Section VI, Appendix A, Rules of Practice) are guidelines for the Licensing Board.

FINDINGS OF FACT

22. The record of this proceeding contains detailed information about the applicant's reactor, associated facilities and arrangements for the reactor's operations. The information embraces factual, analytical and expert opinion data as to such related subjects as the site of the reactor, safety features provided in the reactor's design, safeguards to prevent accidents and to limit their effect, evaluations of various hypothetical accidents, operating procedures, and financial and technical qualifications of the applicant. Significant data in the record, or the absence thereof, bearing upon the Licensing Board's conclusions with respect to the issues set out in the notice of hearing are indicated in this section.

Applicant's Qualifications and Related Matters

23. The applicant is a non-profit, educational institution incorporated under the laws of the State of New York. As of June 30, 1969, the applicant's assets

totaled $490 million, of which $160 million represented land, buildings, and equipment, and $279 million, investments. Income for the year ended June 30, 1969 totaled $151 million; expenditures, $160 million.

24. The estimated operating costs of the applicant's reactor for the 1970-1971 year (exclusive of overhead which is budgeted separately) amounts to approximately $54 thousand. Such costs would be paid out of the applicant's general operating funds. Research costs associated with the use of the reactor would be met by other funds, grants and contracts. The Commission, under its Nuclear Education Training Program, has entered into an agreement with Columbia University under which funds have been granted to the University for fabrication of fuel and all use and other charges for the Commission-owned special nuclear material required by the applicant's reactor have been waived.

25. Because the proposed license is for the conduct of educational activities by a non-profit, educational institution, the applicant's commitment of its own assets against possible public liability losses attendant to a nuclear accident involving the subject reactor is effectively limited to $250,000 — an amount which can be covered by nuclear accident liability insurance. For public liability losses in excess of this amount to an aggregate of $500 million, the United States Government, under Section 170k of the Atomic Energy Act, agrees to indemnify and hold harmless the licensee and other persons as their interests may appear.

26. The applicant's contractor, Gulf General Atomic Incorporated, designed, manufactured and installed the subject reactor. Gulf General Atomic has extensive experience in a wide range of activities in the fields of nuclear research, development, and manufacture. Its research resulting in the development of Triga reactors dates back to 1957 and its experience with Triga reactors since then has been continuing and comprehensive. In his testimony, the manager of the company's Triga reactor program reported that his company's experience includes the operation of three Triga reactors at its laboratories in San Diego, California. Two of these have been operating for several years at steady state power levels of 1500 kw, or six times the steady state power level of the applicant's Triga, and two have been pulsed for a total of over 18,000 times with maximum fuel temperatures of about 450 degrees centigrade.

27. For fuel loading and startup, Gulf General Atomic will send to the applicant a startup engineer thoroughly familiar with Triga reactors and after he and his electronics expert aide have double checked the installation completed by previous members of a Gulf General Atomic installation team and after the AEC inspectors are satisfied with all systems, fuel loading and reactor startup will be performed in accordance with detailed procedures prepared by Gulf General Atomic and accepted by the AEC. Such procedures, according to the testimony, have been in effect for ten years and during that time have been followed in the course of all Triga reactor startups. Once the subject facility is demonstrated to operate satisfactorily, Gulf General Atomic then will turn it over to the applicant.

28. The applicant's Triga Mark II reactor is part of the nuclear engineering program supervised by the Division of Nuclear Science and Engineering of the Faculty of Engineering. The Director of the Division is responsible for all of the programs in nuclear science and engineering in the applicant's Engineering School. Under current planning, two licensed senior reactor operators are to be directly responsible for the operation of the reactor — one, the Reactor Director who has the rank of professor with a background of experience in atomic energy since 1941, and the other, the Reactor Supervisor, who is a full-time nonacademic staff member with reactor operation experience. Both will be licensed operators under AEC rules and regulations.

29. Independent surveillance of the reactor's operations within the applicant's organization will be the responsibility of its Reactor Safety Committee — a group of persons with distinguished technical background — appointed by the President of the University. The Committee is scheduled to review the formulation of and the adherence to appropriate rules and procedures to insure safe operation of the subject reactor. In particular, the Committee will (a) review and approve experimental programs prior to execution, (b) review and approve all changes in existing experimental plans involving any changes in the reactor core, core loading, control rods, or shielding components, and (c) insure that all activities and experiments conform with all applicable government regulations and licenses in regard to the operation of the reactor facility, handling special nuclear materials, and possession and handling of activated by-product material.

30. The University's Health Physicist will assign to the reactor installation members of his staff as needed to handle radiation monitoring problems in aid of the University's Radiation Safety Committee — a committee approved by and reporting to the University President with respect to general problems of radiation hazards at the University.

31. The applicant has prepared written operating procedures for its reactor and the regulatory staff has reviewed these procedures in light of the requirement in the Technical Specifications that there shall be written instructions in effect for, but not limited to, the following subject: (a) checkout and calibration of reactor operating instrumentation and control, control rod drives, and area radiation monitors and air particulate monitors, (b) reactor startup, routine operation and reactor shutdown, (c) emergency and abnormal conditions, including evacuation, re-entry and recovery, (d) fuel loading or unloading, (e) control rod removal or replacement, and (f) maintenance operations which may affect reactor safety. The regulatory staff found that the applicant's procedures carry out the requirements of the proposed license. Certain suggestions of the regulatory staff with respect to amending or augmenting the procedures have been taken care of by the applicant and other limited recommendations are suitable for implementation, as the regulatory staff sees fit, prior to the issuance of an operating license.

32. Subsequent to the first hearing and prior to the second hearing, on May 21, 1970, the Commission published for public comment certain proposed amendments to 10 CFR Part 50. The proposed

amendments provided that information required of an applicant for a construction permit or an operating license concerning plans for coping with an emergency be in accordance with a proposed new Appendix E to 10 CFR Part 50, entitled "Emergency Plans for Production and Utilization Facilities." Later, the proposed amendment with limited modifications was adopted by the Commission, becoming effective January 23, 1971. The record shows that the applicant developed its emergency procedures following discussions with, among others, the Director, Office of Radiation Control, Department of Health of New York City; the Security Office of Columbia University; the Chief in Charge of Fire Prevention, New York City Fire Department; and the Chief, Nuclear Facilities Section, Environmental Surveillance and Control Program, National Center for Radiological Health, Department of HEW. The record also shows that the method for evacuating the reactor building and other buildings is based on the fire evacuation plan of Columbia University and that following notification of civil authorities of an emergency, the plans and emergency procedures of the civil authorities will be followed. According to the regulatory staff at the second hearing, the applicant's emergency procedures met the intent of the then proposed amendment to 10 CFR Part 50 with regard to plans for coping with emergencies.

Common Defense
and Security

33. The record contains no evidence that the interests of common defense and security are involved in the proposed operation of the applicant's reactor. The activities which would be covered by the proposed

operating license will be within the jurisdiction of the United States. The principal officers of the administration of Columbia University are all United States citizens. There is no suggestion that the applicant is owned, controlled, or dominated by a foreign party. The record contains no classified information and the applicant has agreed to safeguard in accordance with Commission regulations any Restricted Data which might become involved. Further, no problem is indicated with respect to the need for military uses of special nuclear material required for the proposed facility and, as regards the safeguarding of special nuclear material which it obtains, the applicant will be required to comply with applicable Commission regulations.

Location and Characteristics of Applicant's Reactor and Other Data

34. The applicant's reactor is housed in the basement of a four-story building (three stories above ground) known as the Terrace Building. The Terrace Building is located in the block of Columbia University campus bounded by College Walk, 120th Street, Amsterdam Avenue, and Broadway. This block is in the midst of the residential community Morningside Heights, Borough of Manhattan, New York City. Morningside Heights is a densely populated area, having an average of 628 persons per net residential acre. In a few blocks of the Morningside Heights area, population density approximates 1,000 persons per acre. By way of comparison, the median range within Manhattan is 500-600 persons per net residential acre.

Initial Decision

35. From a geological standpoint, the site of the reactor is over bedrock with no history of surface ground displacement which might be expected to cause damage to the reactor. The site, being approximately 100 feet above the level of the nearby Hudson River, is free from danger of flooding as a result of a rising of the river. The reactor site is on the side of a hill. No flooding of the storm sewers in the area has occurred in the past fifty years.

36. The applicant's reactor is a research reactor. It is a Triga Mark II reactor designed by Gulf General Atomic Incorporated, formerly the General Atomic Division of the General Dynamics Corporation. It is a heterogeneous pool-type reactor cooled by water, moderated by zirconium hydride and water, and designed to be operated in a steady state condition at power levels up to 250 kw. It also incorporates the capability to conduct experiments involving rapid insertions of excess reactivity which result in split second pulses at peak powers of approximately 250,000 kw. The reactor core is to be located near the bottom of a concrete-aluminum lined tank, 6.5 feet in diameter by 20.5 feet deep, and will be covered by approximately 16 feet of water. Surrounding the core is a l-foot thick graphite reflector, water and a minimum of 8 feet 2 inches of concrete. Experimental facilities include 4 horizontal beam ports, a graphite thermal column, a pneumatic transfer system, a central thimble, and a bulk shielding facility.

37. The core utilizes solid fuel elements in which the zirconium hydride moderator is homogeneously combined with 20% enriched uranium. The reactor loading will have a maximum excess reactivity of 2.45% delta k/k above the

cold, clean, critical condition. A core composed of this type of fuel element has a demonstrated negative prompt temperature coefficient of reactivity. The reactor's peaked power pulse is limited to an energy release which results in fuel temperatures less than 400° centigrade. The experimental program for the reactor is so designed that the maximum reactivity insertion for pulsed operation is 1.5% delta k/k. A mechanical stop assures that this limitation will not be exceeded. The design incorporates four instrumentation channels to monitor and indicate on the control console the neutron flux, power level, and the rate of change of the flux. Three control rods with a total worth of about 5.4% delta k/k are provided to control the power level. In addition, a system of interlocks, radiation monitors and alarms has been provided.

38. The distinctive safety characteristic of the applicant's reactor is the negative prompt temperature coefficient associated with Triga reactors. Because of this characteristic, safe operation of the reactor is assured by the very nature of the fuel material which limits its power output to safe levels. The Triga reactor is distinguished from other research reactors, which secure safety of operation entirely through administrative and engineered safeguards (such as mechanical and electronic safety devices). Research reactors, in turn, are vastly different from power reactors in that the latter generally relate to power levels thousands of times the power levels of research reactors, which produce no electric power and are operated solely as sources of nuclear radiation.

39. The fuel material for the applicant's Triga is a mixture of uranium and zirconium hydride. The uranium is enriched with 20% of the fissionable isotope

uranium-235. This mixture is incapable of nuclear explosion. It is capable of sustaining a chain reaction at the low power levels useful in research reactors.

40. The Licensing Board asked the regulatory staff to furnish a summary of contents of the AEC records of each accidental release of fission products at a Triga reactor, including time, place, model of reactor, its operation licensee, extent of release and its cause, amount of damage or injury, if any, and remedial action. In response to the Licensing Board's request, the regulatory staff introduced into the record data identifying nine accidental releases of fission products at Triga reactors since November 1963. According to the data, all of the releases were within licensed limits, none resulted in concentration in unrestricted areas in excess of 10 CFR Part 20 limits for continuous exposure, and none of the occurrences resulted in facility damage of personnel injuries. Domestic locations of Triga reactors under AEC operating licenses[1] with steady state power levels from 250 kw (same as applicant's) to 1500 kw, are: Aerojet-General Corp., San Ramon, California; Armed Forces Radiobiology Research Institute, Bethesda, Maryland; Gulf General Atomic, Inc.

1. The following information is a matter of public record: Except for the present matter, the issuance of an AEC operating license for any reactor in the research reactor category (which includes Trigas) has never been the subject of a prior public hearing and review by an atomic safety and licensing board. The reason is that in the history of atomic safety and licensing boards no one before now has ever formally contested the issuance of an operating license for a research reactor. As of December 31, 1970, there were AEC licenses in effect for 72 operating research reactors of which 22 were Trigas.

(3), San Diego, California; Kansas State University, Manhattan, Kansas; Michigan State University, Lansing, Michigan; Northrop Corporate Laboratories, Hawthorne, California; Oregon State University, Corvallis, Oregon; Pennsylvania State University, University Park, Pennsylvania; Reed Institute, Portland, Oregon; U.S. Geological Survey, Department of the Interior, Jefferson County, Colorado; Universities of — California (2) at Berkeley and Irvine, Illinois at Urbana, Texas at Austin, and Wisconsin at Madison; and Washington State University at Pullman. The remaining four Trigas under AEC operating licenses all have authorized steady state power levels of less than 250 kw.

41. The inspector from the AEC Division of Compliance assigned to the applicant's reactor reported at the November 1969 hearings that AEC inspections had made ten inspections of the applicant's reactor, surrounding facilities, and associated procedures and found compliance by the applicant with its safety commitments in the building of the reactor. Those items which were incomplete were identified and were regarded as items understandably incomplete at the given stage of construction. The regulatory staff identified no safety problem which it considered to be unresolved.

Applicant's Reactor under
Normal Operation — Radioactive
Releases and Safeguards

42. Normal operation of the applicant's reactor is of two types, namely, steady state operation and pulse mode operation. Whereas the text of the proposed license refers

only to the former type of operation, the latter type is provided for in the Technical Specifications of the applicant's reactor which are incorporated into the proposed license by reference. Steady state operation involves positioning the reactor control rods so that the reactor power is kept at levels not in excess of 250 kw for indefinite lengths of time. Pulse mode operation involves the rapid withdrawal of a single rod. In this mode of operation, a peak power level of approximately 250,000 kw can be attained for a very short length of time (several one-thousandths of a second). In the pulse mode of operation, the peak power is limited by the inherent nuclear characteristics of the reactor, i.e., the higher fuel temperatures cause self-termination of the transient. Although the rate of energy generation (power) during a pulse is high; the total energy generated is relatively small, because of the short time involved. Further, the regulatory staff calculated that if the applicant were to operate the reactor repetitively in the pulse mode, the resultant fission product inventory (in terms of curies) would be less than if the reactor had been operated continuously at 250 kw for the same overall length of time.

43. As a result of normal operation of the reactor, radioactive gases, liquids and solids are produced. Of the gases released in normal operation, the most important from the standpoint of potential hazard is Argon-41. This gas is generated in air-filled beam holes in or near the core of the reactor. If all the beam holes were full of air and all were simultaneously discharged immediately after the reactor had run steadily at 250 kw, the consequence would be a brief rise of the radioactivity in the stack to about 4.5 times the maximum concentration of Argon-41 permissible for continuous discharge under 10 CFR 20.106(a) and 10

CFR 20, Appendix B, Table II, Column 1. The applicant recognizes the desirability of minimizing the discharge of radioactivity and intends either to fill the beam holes with carbon dioxide, helium or other gas that presents no such activation problem as air, or to shut down the reactor until the Argon-41 has decayed to a level that presents no difficulty in meeting regulations.[2] The applicant has shown the will and has the means to keep the releases from its reactor of Argon-41 and other radioactive gases well below the maximum concentration permitted under AEC regulations for release to the atmosphere. The applicable regulations are the Licensing Board's criteria for determining when releases endanger public health and safety and there was no meaningful evidence before the Licensing Board challenging the validity of the regulations.

44. Effluents from the reactor which reach the air in the reactor room will be diluted by the air entering the room through fresh air inlets and through inleakage resulting from the room being maintained below the outside pressure by the ventilating system. All exhaust air from the reactor room will pass through a system of filters, including a pre-filter and a 0.3 micron absolute filter located on the suction side of the reactor room exhaust blower. The blower discharges through an automatic damper into the reactor exhaust stack. The stack, which is a welded, stainless steel duct three feet in diameter, goes up the side of the adjacent, 18-story S.W. Mudd Building and continues above the tower roof 15 feet higher in the

2. A wait of 24 hours will reduce the concentration of Argon-41 by a factor of over 8000 through the natural process of radioactive decay.

air. The 25 mph velocity at which the ventilating air is exhausted from the stack extends the effective height of the stack beyond the height specified in the Technical Specifications as the minimum height for release of air or other exhaust from the reactor room, namely, 249 feet above ground level. Under normal operation, the air in the room and at the mouth of the stack offer no hazard to public health and safety under AEC standards. The applicant's witness indicated that the exhaust air at the mouth of the stack is likely to be cleaner than the intake air because of the purifying effect of the filtering system.

45. A three-inch vent from the reactor thermal column and beam ports and another line at one of the reactor faces are included in the ventilation system. Blower and damper controls are managed by the operator in the control room and in the event of a power failure, all dampers fail in a shut position. Each door opening to the reactor room, except the truck entrance door, will have two locks, one of which is electrically actuated by the reactor operator in the control room. The truck entrance door will remain locked except when loading and unloading operations require it to be open. The doors are the only non-sealed penetrations through the reactor room walls. According to calculations of the applicant, the truck entrance door accounts for 50% of the total leakage rate from the reactor room through its six doors when the ventilation system is off.

46. No liquids are continuously discharged from the reactor to the outside world in normal operation. The reactor core is cooled by the natural convection currents of the water pool in which the reactor is immersed. Heat is

removed from the water of this pool by means of a water-to-water heat exchanger external to the reactor tank and by an evaporative cooling tower on the secondary water loop. The reactor water circulates in a closed loop system. The elevation of this system is well above the reactor core so that the core cannot be exposed as a result of a rupture in the loop.

47. The drainage systems in the reactor room are closed systems with no tie-in to the public sewer system. The floor area in the immediate vicinity of the reactor base is slanted toward a sump capable of containing all of the shielding water in the reactor tank. The sump, made of water-proofed concrete reinforced with steel rods and covered with five coats of epoxy, rests on bedrock. Additionlly, all sink and shower drains about the reactor drain into a 750-gallon stainless steel hold-up tank. Disposal of contaminated water in the tank and sump is provided for according to AEC regulations.

48. The principal solid material which would be activated as a result of operation of the applicant's reactor is used fuel. At infrequent intervals, the applicant might choose to remove used fuel elements from the reactor core by transferring them to a storage rack in the reactor tank. The rack itself is designed to prevent a critical mass. Later, the applicant could place the used fuel elements while still under water in a protective cask for removal from the tank and delivery at the reactor room to a carrier licensed for such purposes by the Department of Transportation. The used fuel ceases to be the applicant's responsibility when the carrier takes over. According to Gulf General Atomic, most of the Trigas in operation, even those in operation

for ten years, have never occasioned the shipment of radioactive fuel. Other solid material activated in the reactor in normal operation, such as sample carriers, parts of the core framework, and small tools, will be handled by conventional means developed over many reactor-years of experience.

Applicant's Reactor
under Accident Conditions

49. Consideration of the applicant's reactor under accident conditions bears upon the issue in the notice of hearing of whether the issuance of the proposed license will be inimical to the health and safety of the public. Thus, if under accident conditions the public would be exposed to excessive radiation, the issuance of the license would be regarded as inimical to the health and safety of the public regardless of the extent of the assurances that the reactor could and would normally be operated under the terms of the proposed license without endangering public health and safety.

50. At 10 CFR Part 100, the Commission has set forth reactor site criteria for stationary power and testing reactors. These criteria are measures for determining whether it is acceptable to locate a particular reactor of either of these types at a given site. The criteria provide guidelines for permissible public exposure to radiation under reactor accident conditions. The guidelines are identified in terms of dosages, length of exposure, population affected and distances from the reactor site. The guidelines also indicate the nature of the accident to be postulated, which historically has been a double-ended

rupture of the primary coolant piping with a fission products release calculated on the basis of a 100% core meltdown. For further guidance, the reactor site criteria refer to Technical Information Document 14844, U.S. Atomic Energy Commission, dated March 23, 1962.

51. The Commission has set forth no comparable site criteria for research reactors in general or for the Triga type research reactors in particular. Nor has it under its statutory authority directed any special class treatment of Triga reactors in terms of safety standards or required findings antecedent to licensing. The absence of specific guidelines oriented to research reactor licensing led the Licensing Board to certify to the Atomic Safety and Licensing Appeal Board the question of what sort of accident should be hypothesized in the present proceeding. The Licensing Board, which has been concerned about licensing a nuclear reactor for operation in the midst of a dense population center, particularly noted that depending on the nature of the accident hypothesized and the postulated fission products release associated therewith, the applicant's reactor might be considered either safe or unsafe for licensing. The Licensing Board stated its view that such substantive factors of measurement are proper subjects for the Commission's determination rather than the Licensing Board's or the parties'. The Appeal Board took the position that the Commission's regulations at 10 CFR Part 50 provide sufficient guidance to the Licensing Board. Accordingly, without providing any substantive answer to the certified question, the Appeal Board referred it back to the Licensing Board for determination of an answer on the basis of the record. The referenced Part 50 of the Commission's regulations identifies general

procedures for the licensing of production and utilization facilities and section 50.34, noted in passing by the Appeal Board, identifies certain data which are required to be included in applications for construction permits and operating licenses. Following receipt of the Appeal Board's response, the Licensing Board reopened the hearing record for limited purposes, including further development of the subject of postulated reactor accident conditions and related exposure of the public to radiation.

52. Drawing upon the Commission's approach to standardize the analysis of safety considerations pertaining to site and to accidental events for stationary power and testing reactors by hypothesizing or postulating a major accident (see 10 CFR 100.11, including footnote 1), the Licensing Board considers that the accident to be postulated in the present proceeding ought to be one which would result in potential hazards not exceeded by those from any accident considered credible. In this sense, the accident is the type (though obviously with vastly different physical characteristics) which the regulatory staff uses in measuring whether public health and safety are adequately protected under power reactor accident conditions. Speculation about how the accident might come about is obviated, the principle being that the hazard from the postulated accident is as great or greater than the potential hazard reasonably associated with any credible accident.

53. The applicant, the regulatory staff, and Riverside and Morningside together each proposed an accident to be postulated for the purpose of determining whether public health and safety are endangered under accident conditions. The applicant's proposed accident, identified

by it as the maximum credible accident, is a defect in the cladding of a fuel element with the shielding water in place either prior to or simultaneously with an accidental insertion of all the available excess reactivity. This is the worst type of accident reported as having actually happened to a Triga reactor. In identifying a substantially more severe accident as its design basis accident, the regulatory staff stated that it "examined all ordinary means by which high temperature conditions could be attained and found that, in the case of the Columbia Triga reactor, physical limitations precluded the high temperature rupture of the cladding of ali or any significant number of the fuel elements." The design basis accident of the regulatory staff is the failure of the cladding of a single fuel element while exposed to air. Both the applicant's maximum credible and the regulatory staff's design basis accidents do not contemplate temperatures in excess of 400° centigrade. Morningside and Riverside proposed the most serious accident, namely, a rupture in air at temperature in the neighborhood of 1000° centigrade of one or several fuel elements.

54. In the opinion of the Licensing Board, credibility is not the mark of the accident possibilities which the intervenors have described in support of the accident which they would postulate for safety calculation purposes. The first of these accident possibilities is sabotage of the reactor by high temperature destruction of the fuel elements with the shielding water removed. This theoretical possibility supposes that determined saboteurs with advanced knowledge of physics and mechanics could plan and successfully execute without prior detection a most complex feat, even under ideal experimental

conditions, involving extensive preparation, highly specialized skills and tools, and serious personal risk. Another accident possibility invoked by the intervenors is a burning aircraft crash. Because of the physical arrangements of the buildings about the reactor, a crashing aircraft, if it were to have any chance of causing the disaster envisioned by the intervenors, would have to fall vertically through a pin-point location (14' x 14') on the roof of the Terrace Building four stories above the reactor core, then across a steel beam and into the reactor core's cellar housing, namely, a shielding water pool 6.5' in diameter, 20.5' in depth and with walls of concrete 8'2" in thickness, which is assumed to be insufficiently protective of the core at the time of the crash. Other references by the intervenors to accident possibilities at 1000° centigrade were mere conceptualizations — a core loading accident out of context with the applicant's reactor and an overheating of the fuel elements in an undefined manner causing a rupture of the cladding, which, according to Gulf General Atomic's experience and analysis, can sustain operation at temperatures in excess of 1000° centigrade.

55. Of the three accidents, the Licensing Board prefers for present purposes the one proposed by the regulatory staff. In terms of the Licensing Board's thinking, a yardstick accident ought to be greater than one which actually happened and accordingly, the applicant's maximum credible accident is regarded as unsuitable. At the same time, in the Licensing Board's opinion, it would be unrealistic to postulate the sort of accident proposed by Morningside and Riverside because the consequences of such an accident are too far removed from the potential hazard reasonably associated with any credible accident.

As the Licensing Board sees the situation, no credible accident would result in a potential hazard greater than the one which would come about under the regulatory staff's proposed accident.

56. In addition to the postulated accident, the assumed fission products release fraction is also critical to any determination of whether the health and safety of the public are adequately protected under reactor accident conditions. The applicant and the regulatory staff assumed a fission products release fraction of 1.5×10^{-5}, that is, 15 parts per million. This figure was based on an experiment and calculations performed in 1966 by General Atomic Division of General Dynamics Corporation (General Atomic). The figure was accepted by both the applicant and the regulatory staff, which had checked the figure with independent analytical calculations of their own but with no new experimental data. The figure was challenged by a witness for Morningside and Riverside as not being proper for use in measuring the hazards associated with the applicant's reactor under accident conditions. The witness' attack on the figure was based on two points: first, by its very nature the high temperature accident proposed by Morningside and Riverside would involve a substantially higher fission products release fraction than would result from the accidents proposed by the applicant and the regulatory staff, and second, the release fraction assumed by the applicant and the regulatory staff for their accidents is open to question because of an experiment in 1960 by General Atomic which supported a higher release fraction than 1.5×10^{-5}. Following through with his second point, Riverside's witness noted, too, differences of indeterminate significance between the conditions of the

later experiment and those applicable to the subject reactor as well as certain variances among the data derived from the later experiment. The manager of the Triga reactor program of Gulf General Atomic Incorporated (which succeeded to General Atomic) affirmed his conviction as to the validity of the conclusion derived from the later experimental data (as did the applicant and the regulatory staff, and all with supporting reasons) but candidly stated that a determined search by his company uncovered no satisfactory explanation for the different experimental results. Nor did the applicant or the regulatory staff disclose any experimental data of its own or of another source which would either shed light on the discrepancy of fission products release fractions derived from the two experiments or establish a fission products release fraction of unquestionable validity. The two release fractions as determined in 1960 and 1966 are 9600 parts per million (0.96%) and 3 parts per million (3×10^{-6}), respectively. Neither the 1960 figure nor the 1966 figure, which are more than 3,000 times apart, includes any multiplicative safety factor. The fission products release fraction 15 parts per million (1.5×10^{-5}) represents the product of multiplying the figure of 3 parts per million by a safety factor of 5.

57. Morningside and Riverside proposed a fission products release fraction of 4% (40,000 parts per million) as appropriate for their yardstick accident, namely, a rupture of the cladding of one or several fuel elements in air at temperature in the neighborhood of 1000° centigrade. The two intervenors based the 4% figure on the results of certain AEC sponsored tests, known as the SNAPTRAN tests (completed in 1964). These tests

involved the deliberate destruction at high temperature – the record indicates 1100° centigrade — of a reactor chemically similar to the applicant's in that it was an uranium-zirconium hydride fuel reactor. The applicant's and the regulatory staff's challenge to the proposed fission products release fraction of 4% was based on their contention that a high temperature accident as proposed by the two intervenors has no applicability in the proceeding. There was no questioning the 4% figure as being properly related to such a high temperature accident. The fission products release fractions considered at the hearing thus range from a low of 3 parts per million (to which a safety factor of 5 had been applied) to a high of 40,000 parts per million.

58. In its consideration of the applicant's Triga reactor, the regulatory staff mainly relied on information supplied by the manufacturer of Triga reactors and by Triga reactor operators and on its own analysis of such information. Relevant experimantal data developed either by itself or by one of its contractors were not in evidence. Further, the regulatory staff did not appear to have an objective standard for determining the acceptability of Triga reactors under accident conditions or to have a stable approach for making calculations pertinent to determining radiation exposure under such conditions. In about half of the cases of licensed, operating Trigas, the regulatory staff hypothesized an accident while shielding water was in place. In the remainder of cases, the more recent ones, the hypothesized accident involved the failure of one fuel element while in air. For just four Trigas, the maximum fission products release fraction assumed was 10^{-5} (10 parts per million). For other Trigas — including a number licensed after the General Atomic experiment in 1966 –

the corresponding release fraction figure used for purposes of safety evaluation was 1% or 2% (10,000 or 20,000 parts per million). In one instance, the regulatory staff made a safety calculation for a Triga on the basis of a fission products release fraction of 2.8% (28,000 parts per million) — which is the approximate equivalent of multiplying the 1960 experimentally derived figure of .96% by a safety factor of 3.

59. As noted earlier, the reactor site criteria for stationary power and testing reactors at 10 CFR Part 100 set certain guidelines for evaluating a reactor site under accident conditions. According to these guidelines, an individual located on the boundary of the defined "exclusion area" for two hours immediately following onset of the postulated fission products release should not receive a total radiation dose to the whole body in excess of 25 rem or a total radiation dose in excess of 300 rem to the thyroid from iodine exposure. Similarly, an individual located on the outer boundary of the defined "low population zone" who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) should not receive the foregoing radiation doses. The guidelines also provide that the distance from the reactor to the nearest boundary of a densely populated center containing more than about 25,000 residents should be at least one and one-third times the distance from the reactor to the outer boundary of the low population zone and that greater distances may be necessary where large cities are involved. The Licensing Board endeavored to extract criteria from these guidelines to evaluate the dangers to public health and safety of a postulated accident to the applicant's reactor. The

Licensing Board's extended efforts to arrive at objective criteria in this manner were unproductive. "Exclusion area" and "low population zone," together with the indicated radiation exposure limits therefor, and "population center distance" have no sensible application to the applicant's situation. In the Licensing Board's judgment, the concept of "exclusion area" at 10 CFR Part 100 is not compatible with any part of the area immediately outside the reactor room within the Terrace and Mudd Buildings complex. Though the applicant may exclude persons from such area, the area is much too public to fit into the category of an "exclusion area." Clearly, there is no "low population zone." about the reactor site, and "population center distance" is non-existent. Nor do the radiation exposure limits at 10 CFR Part 20, which are applicable to normal operation, afford a practicable approach for dealing with the issue of public health and safety under conditions of a postulated accident unless the accident consequences are of such a minor sort that they might be assumed to be embraced in normal operation.

60. U ^{235} is the primary source of radiation in nuclear reactors. The amount of U ^{235} for possession and use by the applicant in connection with the proposed operation of its reactor is 3.3 kg. This compares to amounts ranging from 54 kg to 216 kg for the four licensed test reactors in operation and to amounts ranging from 250 kg to 5,000 kg for licensed power reactors in operation.[3] From an

3. Data compiled from information available to the public through the Public Proceedings Branch, Office of the Commission's Secretary.

individual's standpoint, there is no difference between a given dose of radiation from a power or test reactor and one in the same amount from a research reactor.

61. The extent of public exposure to radioactive releases emitting from the reactor exhaust stack was calculated by the applicant for the following locations: (i) at ground level at West 119 Street and Amsterdam Avenue, (ii) in the S.W. Mudd Building for floors above the 7th (reflecting the proximity of air intakes to the mouth of the stack), and (iii) by a window of the highest occupied floor (the 19th) of the nearby Interchurch Center. In the course of the applicant's calculations for location (i), a dilution factor of greater than 20,000 was arrived at. With respect to location (ii), the calculations indicated that a fuel element cladding failure with the shielding water in place would cause exposure for the first hour to be at the most 7 millirem. With respect to location (iii), a dilution factor of more than 16,000 was calculated. On the other hand, apropos to the interest of Morningside and Riverside in the extent of exposure of people living in nearby apartment buildings to stack emissions of Argon-41, the regulatory staff stated that the applicable dilution factor varies from 40 to 200.

62. A summary of the calculated radiation doses in millirem (mr) under various accident conditions at specified locations outside the reactor area with different assumptions as to the fission products release fraction and the status of the ventilation system (whether on or off) is presented in the five tables below. Tables I and III presents figures submitted by the applicant in response to the Licensing Board's request for additional data following its

study of the record of the earlier hearing. Table II represents an extension of Table I and Tables IV and V represent extensions of Table III. The regulatory staff noted its "essential agreement" with the applicant's calculations and though they gave a different application to the calculations than did the applicant, the intervenors did not dispute the applicant's figures as such. With reference to whether the ventilation system is on or off during accident conditions, the applicant's operating procedures of August 15, 1969 provide for the ventilation system being shut down under conditions of an accident involving radiation releases and its turning on thereafter depending on evaluation of the accident.

TABLE I

APPLICANT'S MAXIMUM CREDIBLE ACCIDENT

(Defect in Cladding of a Fuel Element With Shielding Water in Place and Fission Products Release Fraction Assumed To Be 1.5×10^{-5} or 15 ppm)

Exposure Time	Doses at Truck Door in Parking Area		Doses At West 119 St. and Amsterdam Ave.		Doses at Mouth of Stack	
	Whole Body	Thyroid	Whole Body	Thyroid	Whole Body	Thyroid
			Ventilation Off			
2 hours	0.3 mr	0	2×10^{-4} mr	0	0	0
20 hours	1.1 mr	0	6×10^{-4} mr	0	0	0
50 hours	1.2 mr	0	8×10^{-4} mr	0	0	0
			Ventilation On*			
2 hours	8×10^{-3} mr	0	4×10^{-6} mr	0	8×10^{-3} mr	0

* Occupation for time greater than 2 hours does not lead to increased dose.

TABLE II

APPLICANT'S MAXIMUM CREDIBLE ACCIDENT

(Defect in Cladding of a Fuel Element With Shielding Water in Place and Fission Products Release Fraction Assumed To Be 2.8% or 28,000 ppm)

Exposure Time	Doses at Truck Door in Parking Area		Doses at West 119 St. and Amsterdam Ave.		Doses at Mouth of Stack	
	Whole Body	Thyroid	Whole Body	Thyroid	Whole Body	Thyroid
Ventilation Off						
2 hours	5.6×10^2 mr	0	0.4 mr	0	0	0
20 hours	2.0×10^3 mr	0	1.1 mr	0	0	0
50 hours	2.2×10^3 mr	0	1.5 mr	0	0	0
Ventilation On*						
2 hours	15 mr	0	7.5×10^{-3} mr	0	15 mr	0

* Occupation for time greater than 2 hours does not lead to increased dose.

TABLE III

REGULATORY STAFF'S DESIGN BASIS ACCIDENT

(One Ruptured Fuel Element in Air With Fission Products Release Fraction Assumed To Be 1.5×10^{-5} or 15 ppm)

Exposure Time	Doses at Truck Door in Parking Area		Doses at West 119 St. and Amsterdam Ave.		Doses at Mouth of Stack	
	Whole Body	Thyroid	Whole Body	Thyroid	Whole Body	Thyroid
			Ventilation Off			
2 hours	1.3 mr	10×10^{3} mr	0.7×10^{-3} mr	0.8 mr	0	0
20 hours	6.3 mr	65×10^{3} mr	3.5×10^{-3} mr	5.0 mr	0	0
50 hours	11.0 mr	120×10^{3} mr	6.0×10^{-3} mr	9.0 mr	0	0
			Ventilation On			
2 hours	.1 mr	0	1×10^{-5} mr	10^{-4} mr	.023 mr	2×10^{3} mr
20 hours	.5 mr	0	5×10^{-5} mr	10^{-4} mr	.023 mr	2×10^{3} mr
50 hours	1.0 mr	0	1×10^{-4} mr	10^{-4} mr	.023 mr	2×10^{3} mr

TABLE IV

REGULATORY STAFF'S DESIGN BASIS ACCIDENT

(One Ruptured Fuel Element in Air With Fission Products Release Fraction Assumed To Be 2.8% or 28,000 ppm)

Exposure Time	Doses at Truck Door in Parking Area		Doses At West 119 St. and Amsterdam Ave.		Doses at Mouth of Stack	
	Whole Body	Thyroid	Whole Body	Thyroid	Whole Body	Thyroid
Ventilation Off						
2 hours	2.4×10^{3} mr	1.9×10^{7} mr	1.3 mr	1.5×10^{3} mr	0	0
20 hours	11.7×10^{3} mr	12.1×10^{7} mr	6.5 mr	9.3×10^{3} mr	0	0
50 hours	20.5×10^{3} mr	22.4×10^{7} mr	11.0 mr	17.0×10^{3} mr	0	0
Ventilation On						
2 hours	1.9×10^{2} mr	0	1.9×10^{-2} mr	1.9×10^{-1} mr	43 mr	3.7×10^{6} mr
20 hours	9.3×10^{2} mr	0	9.3×10^{-2} mr	1.9×10^{-1} mr	43 mr	3.7×10^{6} mr
50 hours	19.0×10^{2} mr	0	1.9×10^{-1} mr	1.9×10^{-1} mr	43 mr	3.7×10^{6} mr

TABLE V

ACCIDENT PROPOSED BY MORNINGSIDE AND RIVERSIDE*

(Release From Single Fuel Element in Air With Fission Products Release Fraction Assumed To Be 4% or 40,000 ppm)

Exposure Time	Doses at Truck Door in Parking Area		Doses at West 119 St. and Amsterdam Ave.		Doses at Mouth of Stack	
	Whole Body	Thyroid	Whole Body	Thyroid	Whole Body	Thyroid
Ventilation Off						
2 hours	3.5×10^{3} mr	2.7×10^{7} mr	1.9 mr	2.1×10^{3} mr	0	0
20 hours	16.8×10^{3} mr	17.3×10^{7} mr	9.3 mr	13.3×10^{3} mr	0	0
50 hours	29.3×10^{3} mr	32.0×10^{7} mr	16.0 mr	24.0×10^{3} mr	0	0
Ventilation On						
2 hours	2.7×10^{2} mr	0	2.7×10^{-2} mr	2.7×10^{-1} mr	61 mr	5.3×10^{6} mr
20 hours	13.3×10^{2} mr	0	1.3×10^{-1} mr	2.7×10^{-1} mr	61 mr	5.3×10^{6} mr
50 hours	27.0×10^{2} mr	0	2.7×10^{-1} mr	2.7×10^{-1} mr	61 mr	5.3×10^{6} mr

* The accident proposed by Morningside and Riverside relates to failure of one or several fuel elements. The consequences of the failure of several fuel elements may be calculated by multiplying the above figures by the effective number of failing elements.

Initial Decision

FINDINGS AND CONCLUSIONS PROPOSED BY PARTIES

63. The Licensing Board's position with respect to the findings and conclusions proposed by each of the parties is set forth on attachments hereto. Attachment A pertains to the proposed findings and conclusions of the applicant; Attachment B to those of the regulatory staff; and Attachment C to those of intervenor Mrs. Weik. The proposed joint findings of fact of intervenors Morningside and Riverside are considered at Attachment D and their proposed joint conclusions of law are considered at Attachment E.

CONCLUSIONS

(Paragraphs 64-69 are addressed directly to the formal issues in the notice of hearing, set out at paragraph 19.)

64. There is reasonable assurance that operation of the applicant's reactor at steady-state power levels up to a maximum of 250 kilowatts (thermal) and in the pulse mode with reactivity insertions up to a maximum of 1.5% delta k/k under the conditions and limitations in the form of license proposed by the regulatory staff, together with the associated Technical Specifications, can be conducted without endangering the health and safety of the public.

65. There is reasonable assurance that such operation of the applicant's reactor would be conducted in compliance with the rules and regulations of the Commission should such a license be issued.

66. The applicant is technically qualified to engage in the activities within the scope of the proposed license in accordance with the rules and regulations of the Commission.

67. The applicant is financially qualified to engage in the activities within the scope of the proposed license in accordance with the rules and regulations of the Commission.

68. The issuance of the proposed license to the applicant would not be inimical to the common defense and security.

69. The Licensing Board declines to decide the issue of whether the issuance of the proposed license will be inimical to the health and safety of the public. In this regard, the Licensing Board notes the following:

A. The Licensing Board identifies the foregoing issue with the question of whether under a postulated reactor accident the health and safety of the public would be endangered.

B. The absence of applicable substantive criteria of the Commission and of convincing objective standards of the regulatory staff — all quite distinct from provisions at 10 CFR Part 50, such as at sections 50.40 and 50.41(b) — prompts the Licensing Board to decline answering the question of whether the health and safety of the public would be endangered upon the

occurrence of a postulated accident to the applicant's reactor. The Licensing Board considers it inappropriate to enforce an answer derived from the narrow confines of a single proceeding and its own personal views about the degree to which the health and safety of the public ought to be protected against accident consequences.

C. In the Licensing Board's opinion, the fission products release fraction under postulated accident conditions for such a standard product as a Triga reactor ought to be a matter of proven determination and unquestionable validity. From the Licensing Board's standpoint, resolution of existing conflict in data and ascertainment of firm figures ought to be accomplished through a new experiment under the auspices of the regulatory staff. The sponsorship of such an experiment, in the Licensing Board's view, is within the province of the regulatory staff in attending to the interests of the public in the process of licensing Triga reactors. There ought to be an end to the past practice of the regulatory staff, which lessens its credibility, of shifting basis in its safety evaluation of accident conditions from one Triga case to another by varying the combination of postulated accident and fission products release fraction assumed.

D. In order to facilitate ultimate resolution of the subject issue which it has declined to decide in this Initial Decision, the Licensing Board has incorporated herein basic data derived from the hearing and certain judgments thereon bearing upon the issue.

70. Apart from paragraph 69, it is the Licensing Board's position that prior to any licensing of the applicant to operate its reactor the following items should be taken care of to the satisfaction of the regulatory staff.

A. Air leakage from the reactor room, particularly at the truck entrance door, be reduced to the extent practicable;

B. Locking and unlocking of the truck entrance door be placed under the control of a person in the reactor room in a manner comparable to his control over other doors to the room;

C. Once the postulated accident and its fission products release fraction are authoritatively determined, radiation exposure resulting from stack emissions with the ventilation system open under accident conditions be calculated for persons in the S.W. Mudd Building who might be affected because of that building's air intakes, for persons on ground level at the corner of Amsterdam Avenue and West 119 Street, for persons on the 19th floor of the Interchurch Center at an open window facing Claremont Avenue, and for persons living in and using nearby apartment and public buildings;

D. Applicant's emergency plans and procedures be reviewed and if necessary, be amended in order to assure compliance with the substantive requirements for an applicant seeking a license to operate a nuclear reactor, as set forth in the new Appendix E. 10 CFR Part 50; and

E. In addition to the provisions in the form of license accompanying the notice of hearing, the license itself ought to include a provision specifying that the licensee may operate the reactor in the pulse mode with reactivity insertions up to a maximum of 1.5% delta k/k.

ORDER

71. Not being in position to make a proper determination of one issue in the notice of hearing, as noted at paragraph 69, the Licensing Board necessarily denies authorization to the Director of Regulation to issue to the applicant the proposed operating license.

APPEAL AND REVIEW PROCEDURES

72. Within twenty (20) days after service of this Initial Decision, any party to this proceeding may file exceptions to the Initial Decision and a brief in support of them with the Atomic Safety and Licensing Appeal Board. Copies of such exceptions and brief shall be served on all other parties. Further, any party to this proceeding may file a brief in support of or in opposition to exceptions filed by any other party within ten (10) days after the service of exceptions. The Rules of Practice, 10 CFR Part 2, include additional information about administrative appeal and review procedures applicable to this Initial Decision. The Commission's delegation of its review function in this matter to the Appeal Board was indicated by notice published in the September 11, 1969 issue of the Federal Register (34 F.R. 14302).

Initial Decision

ATOMIC SAFETY AND
LICENSING BOARD

s/ Eugene Greuling
Eugene Greuling

s/ Hood Worthington
Hood Worthington

s/ Valentine B. Deale
Valentine B. Deale
Chairman

Washington, D.C.

April 6, 1971

ATTACHMENT A

Licensing Board's Position With
Respect to Applicant's Proposed
Findings and Conclusions

Following each of the two hearing sessions, on November 18-20, 1969 and on July 10, 1970, the applicant submitted a set of proposed findings and conclusions. The applicant also submitted responses to the two corresponding proposed findings and conclusions of Morningside and Riverside. The paragraph references below are to the applicant's second set of proposed findings and conclusions, which superseded its first one.

Initial Decision

Paragraphs 1 through 10 of the applicant's proposed findings and conclusions recite the principal considerations in the procedural history of the proceeding. The considerations are amply identified in the Initial Decision. The Licensing Board did consider the evidence referenced by the applicant at subparagraphs 11(a) through 11(e).

The applicant's conclusions on the issues set out in the notice of hearing are proposed at paragraphs 12, 13 and 14. The Licensing Board is in agreement with paragraph 12, paragraph 13, and that part of paragraph 14 pertaining to common defense and security. The remainder of paragraph 14 answers negatively the noticed issue of whether the issuance of the proposed license will be inimical to the health and safety of the public. The Licensing Board takes no position on this issue for the reasons indicated at paragraph 69 of the Initial Decision.

With respect to the last four paragraphs of the applicant's proposed findings and conclusions, the Licensing Board agrees with paragraph 15, disagrees with paragraph 16 on the basis of the unanswered safety issue referred to above, regards paragraph 17 as superfluously restating substantive considerations attended to elsewhere, and necessarily rejects the announcement at paragraph 18 that an order for the issuance of the license is being issued.

ATTACHMENT B

Licensing Board's Position With
Respect to Regulatory Staff's
Proposed Findings of Fact and
Conclusions of Law

Initial Decision

The regulatory staff submitted proposed findings and conclusions of law following the hearing on November 18-20, 1969 and supplemented such findings and conclusions after the hearing on July 10, 1970. The regulatory staff also submitted responses to the two corresponding proposed findings and conclusions of the three intervenors.

In its first two sections, covering preliminary matters and procedural considerations, the Initial Decision embraces and expands upon the subject matter of the regulatory staff's findings and conclusions at paragraphs 1 through 4, including supplemental paragraphs 3.A, 3.B, and 3.C. The Licensing Board concurs with the statement at paragraph 5 that the applicant's alleged failure to consult with the surrounding community concerning the installation and operation of the facility and the alleged absence of demonstrated benefits to the community therefrom are not matters relevant to the issues in the proceeding.

Paragraphs 6 through 9 and supplemental paragraph 9.A are adequate statements of fact except that the Licensing Board would add "under normal operating conditions" after "such releases" in the last sentence of paragraph 9. The Licensing Board did consider the evidence referenced at subparagraphs 10(a) through 10(e).

The revised paragraph 11 and supplemental paragraphs 11.A, 11.B, and 11.C present a mixture of acceptable and unacceptable statements pertaining to the issue of whether the health and safety of the public will be endangered under reactor accident conditions. The Licensing Board's

corresponding findings on this issue are set forth at paragraphs 49 through 62 of the Initial Decision, including Tables I through V following the text of paragraph 62. The Licensing Board's conclusion is stated at paragraph 69 of the Initial Decision.

The Licensing Board specifically agrees with the footnote to the revised paragraph 11 stating that the handling of the fuel outside the facility is not a matter of issue in the proceeding.

There is no objection to paragraph 12. Paragraph 13 is unacceptable; it reaches too far. The necessary qualification can be derived from the Licensing Board's conclusion at paragraph 69 of the Initial Decision. It follows that the regulatory staff's proposed order at paragraph 14 must be rejected.

ATTACHMENT C

Licensing Board's Position With
Respect to Findings and Conclusions
of Mrs. Mary Hays Weik

Intervenor Mrs. Mary Hays Weik submitted findings of fact and conclusions following the hearing on November 18-20, 1969 and submitted further findings and conclusions following the hearing on July 10, 1970. The Licensing Board's position with respect to Mrs. Weik's first set of findings and conclusions on a paragraph-by-paragraph basis is as follows:

(a) Paragraphs 1 and 2, relating to benefits, or lack thereof, to the community from the applicant's reactor, are irrelevant to the issues in the notice of hearing. It is not for the Licensing Board to weigh community risks vs. community benefits.

(b) Paragraph 3 and subparagraphs (a) through (h) reflect, in the main, unsubstantiated, personal opinions derogative of the safety of the applicant's reactor and AEC standards. The supplementary limited references to other opinions of both identified and unidentified authorship add nothing of value.

(c) The extreme appraisal at paragraph 4 and subparagraph (a) is unrealistic and without support in the record. Nor does it take into fair account the United States Government's indemnity arrangements covering possible public liability losses. The Licensing Board's position regarding the applicant's financial qualifications is set out at paragraphs 23, 24 and 25 of the Initial Decision. See also paragraphs 39 and 60.

(d) Paragraph 5 and subparagraph (a) are directed to alleged hazards to the New York City water supply. The subject matter is pertinent to the proceeding and is related to evidence in the record. The Licensing Board's disagreement with Mrs. Weik's findings is explained below in its consideration of Mrs. Weik's supplemental set of findings and conclusions following the July 10, 1970, hearing, wherein Mrs. Weik's position on the alleged hazards to the New York City water supply is more fully developed.

(e) At paragraph 6, Mrs. Weik urges that the proposed operating license be denied unqualifiedly and at subparagraph (a) thereto, suggests that an investigation be made of radioactive releases resulting from existing experiment programs of the applicant. The Licensing Board refers to its own conclusions at paragraphs 64 through 70 of its Initial Decision and notes that its order denying authorization to license the applicant to operate its reactor is for the reason stated therein and for no other reason. The Licensing Board rejects Mrs. Weik's suggestion of an investigation as being unsupported by the record.

In her submission of findings and conclusion following the July 10, 1970 hearing, Mrs. Weik re-emphasized her concern over the relationship between the site of the applicant's reactor and the New York City water supply, questioned the consideration given to the applicant's unlisted sources of radiation, insisted that the siting of the applicant's reactor should be on the basis that it is a "Test Reactor", and challenged the integrity of the hearing. The Licensing Board's views on these four lead contentions of Mrs. Weik are as follows:

(a) Mrs. Weik's view that the site of the reactor presents a hazard to the New York City water supply is predicated on the supposition that an earthquake of greater intensity than ever occurred in recorded history of Manhattan could destroy the present containment system for reactor room drainage water and reactor pool water and that as a result, such water, which is taken for granted to be dangerously contaminated, would work its way into the New York City water

supply without becoming significantly diluted. A witness supporting Mrs. Weik's position also stressed the possibility of contaminated water from the reactor area seeping its way into the New York City water supply.

The Licensing Board is persuaded by the evidence from both the applicant and the regulatory staff, including expert geological testimony, that earthquakes do not present a real danger to the applicant's Triga reactor; that in any event, if there were a serious rupture in the drainage water and shielding water tanks, there is no basis in reality for supposing that the water would enter the New York City water supply system and endanger public health and safety. Further seepage is not regarded as credible means for the reactor water to endanger the City's water supply. See paragraphs 35, 36, 46 and 47 of the Initial Decision and Licensing Board's comments under the heading "Site Factors" at page one, Attachment D.

(b) In referring to "unlisted sources of radiation" at Columbia University, Mrs. Weik stated that it "is hard to see why no mention had been made of the added contamination from these sources." In responding to the eleventh question of the Licensing Board's Request for Additional Data (April 6, 1970), the applicant listed radioactive materials and radiation producing devices not licensed by the AEC and located in the S. W. Mudd Building and Terrace Building. The applicant's explanation of the significance of these materials and devices and its care of them was satisfactory to the Licensing Board.

(c) Mrs. Weik's treatment of the question of whether the applicant's reactor is a test reactor overlooks completely the merits of the Atomic Safety and Licensing Appeal Board's determination, in response to a certified question from the Licensing Board, that the applicant's reactor is not a "testing facility" within the meaning of the Commission's definition at 10 CFR Part 50.2(r). Mrs. Weik's comments afford the Licensing Board no occasion to question the Appeal Board's ruling.

(d) Mrs. Weik made a broadside attack on public hearings associated with nuclear reactor licensing. She complained that there is "an increasing use of testimony by so-called expert witnesses for the Applicant company and the Government, who are willing to use for the sake of the nuclear projects planned, evasion and distortion of the truth, concealment of known facts, and even outright lies – all under oath and with full awareness of the dangerous human consequences of their dishonorable action." The Licensing Board finds nothing in the record of this proceeding to lend support to Mrs. Weik's extravagant charges and upon examination of the specific examples cited by Mrs. Weik as "untrue and self-contradicting testimony," the Licensing Board further finds that Mrs. Weik's derogatory commentary about the testimony, which was given by a principal witness of the applicant and by a principal witness of the regulatory staff, is unjustified and unfair to the witnesses concerned.

ATTACHMENT D

Licensing Board's Position
With Respect to
Proposed Findings of Fact of
Morningside Renewal Council, Inc. and
Riverside Democrats, Inc.

Following each of the two hearing sessions, on November 18-20, 1969 and on July 10, 1970, Morningside and Riverside jointly submitted a set of proposed findings of fact, the later submission superseding the earlier one. The two intervenors also joined in a document of September 25, 1970 which took exception to certain parts of the regulatory staff's supplemental proposed findings of fact and conclusions of law. The Licensing Board's position with respect to the amended proposed findings of fact follows, the topical headings and paragraph numbers being those used by the two intervenors:

Community Opposition to the Reactor

Paragraph 1 and subparagraphs (a) through (o) provide a summary of limited appearances. The Licensing Board addresses itself to the same subject at paragraphs 7 through 13 of its Initial Decision.

Site Factors

Paragraphs 2 and 3 of the intervenors' proposed findings of fact and paragraph 34 of the Initial Decision cover essentially the same information.

Initial Decision

Paragraph 4 comprises statements of fact generally acceptable, the 200' reference being assumed to be an estimate of the distance between the reactor and the closest point to the Croton aqueduct. However, for purposes of a finding on site factors, paragraph 4 by itself is regarded as incomplete and misleading. Significant omissions, for example, relate to the present status of the underground water courses and the disappearance of ponds and creeks on account of the heavy building in the area; what lies between the reactor and the Croton aqueduct, namely, concrete shielding several feet thick about the reactor area and the Manhattan schist formation; and the lower elevations of the sump serving the reactor room and of the reactor room itself as compared with the elevation of the Croton aqueduct.

Lack of a Compelling Need for the Reactor

Paragraphs 5 through 8, bearing on the question of need for the reactor, are irrelevant to the noticed issues.

Accidents and Other Incidents Involving Triga Mark II and Other Research Reactors

The Licensing Board has no objection to the recitation at paragraph 9 of Gulf General Atomic's statistical information about the number and whereabouts of Triga Mark II's and other Triga-type reactors in operation. The recital of AEC data about reported Triga accidents in the United States is also acceptable. Cf. paragraph 40 of the Initial Decision and footnote thereto. The characterization of paragraph 10 that Triga accidents typically approach

the radioactivity release limit under AEC regulations needs qualification as suggested by the explanation in the underlying testimony. The proposed findings at paragraphs 11 and 12 are neither relevant nor material.

Applicant's Unsatisfactory
Experience in Reactor Operation

The proposed finding at paragraph 13 deals with various incidents of indeterminate significance occurring from January 1960 to June 1963. Their relevance or materiality in the present proceeding is remote and speculative.

Inadequacies of Applicant's Safety
Analysis Report, Operating
Procedures and Facility

As reflected in its Initial Decision, the Licensing Board agrees with the substance of paragraph 14, namely, that the postulated fission products release fraction involves an unresolved question requiring further attention. Contrary to paragraph 15, the board is satisfied with the applicant's handling of the ventilation system in its operating procedures, which are subject to change and refinement as operating experience is accumulated. Regarding paragraph 16, the Licensing Board recommends that air leakage from the reactor room, particularly at the truck entrance door, be reduced to the extent practicable. See paragraph 70 A. of the Initial Decision.

Paragraph 17 and the associated subparagraphs (a), (b) and (c) deal with the subject matter of radioactive gaseous

emissions, particularly Argon-41. The findings of the Licensing Board related to this material, except for subparagraph (c), are indicated in its Initial Decision at paragraphs 43, 44, 45 and 61 and at the tables following paragraph 62. The Licensing Board's conclusion at paragraph 70 C. is also in point. The intervenors' proposed finding at subparagraph (c) of their paragraph 17 implies an erroneous premise, namely, that the applicant and the regulatory staff are obliged to check out the validity of the AEC standards governing radioactive releases to the atmosphere before they are entitled to follow such standards. As noted at paragraph 43 of the Initial Decision, there is no evidence of record to occasion the Licensing Board to question the standards. See also the comment under contention (e) at paragraph 13 of the Initial Decision.

Paragraph 18 is an emalgam of partial truth, irrelevancies and plain misconstruction of the relationship between the applicant's procedures for discharging radioactive waste into the New York City sewage system and the AEC 10 CFR Part 20 standards. Contrary to the false impression which this paragraph presents by a play on the words "ten times the quantity specified in 10 CFR 20," the applicant's operating procedures reflect implementation of the AEC standards. A reading of the full text of the applicant's procedure from which the "ten times" language was taken and of the applicable provisions of Part 20, namely, Section20.303 (b)(2) and (c), gives proper focus to the subject matter. With respect to paragraph 19, the transportation of irradiated fuel from the applicant's facility is not a subject of the proceeding.

Paragraph 20 provides pieces of information which may be construed as having a public relations implication but which are immaterial in the present proceeding. Of particular note is the applicant's statement that it has no plans for community evacuation. In the highly improbable event of a need for community evacuation, the undertaking is properly for civil authorities to handle and the applicant plans to proceed accordingly. See paragraphs 32 and 70 D. of the Initial Decision for the Licensing Board's finding and conclusion concerning the applicant's emergency plans and procedures.

Paragraph 21 states that the applicant presented "no concrete data" relating to the operating or safety performance of Trigas abroad. The Licensing Board does not consider the omission to be significant in view of the ample evidence available concerning the operation of Trigas in the United States. Otherwise, one might agree or disagree with the intervenors' statement depending on his construction of the meaning of the quoted term. The applicant's witness from Gulf General Atomic did indicate that his company has received "quite a bit of information relating to the operation of Mark II reactors abroad," that when the managers of these units have trouble they "usually" notify the company, and that he has no knowledge of any incident involving foreign-based Trigas (Tr. 943). On the other hand, the same witness later, in the context of a discussion regarding AEC-reported incidents of radioactive releases from Trigas, noted that a few incidents have occurred on foreign reactors (Tr. 1078). The witness had made the point earlier that "There has not been one incident in the entire world where the operation of a research reactor [which includes

Trigas] has resulted in a fatality or serious injury, even to the operating staff, let alone the general public" (following Tr. 328, prepared testimony, p. 6).

With respect to paragraph 22, the Licensing Board does not agree that it should discount the professional opinion of a regulatory staff witness who testified that the applicant's reactor could withstand without damage the ground vibration of an earthquake equal in intensity of the largest earthquake observed in the New York City area.

Maximum Credible Accident
and Design Basis Accident

The subject matter of paragraphs 23, 24, 25 and 26, including subparagraphs (a), (b), (c) and (d) of paragraph 24, and the supplemental submission of September 25, 1970, is dealt with by the Licensing Board in its Initial Decision at paragraphs 49 through 62 and the five tables following paragraph 62. The intervenors err in trying to resolve the question of whether the health and safety of the public is endangered under conditions of a postulated accident to the applicant's reactor by using the standards of 10 CFR Part 20 and the criteria of 10 CFR Part 100 as simple yardsticks. These standards and criteria are designed for other purposes and have no immediate applicability to the question at hand. See paragraphs 59 and 69 of the Initial Decision.

Paragraph 27 describes the accident which Morningside and Riverside wish to postulate for purposes of determining whether the health and safety of the public would be adequately protected under conditions of an

accident to the applicant's reactor. Such accident is a high temperature rupture in air of one or several fuel elements. The Licensing Board indicates its own view about this choice of a postulated accident at paragraphs 54 and 55 of the Initial Decision. Paragraph 28 correctly indicates that the intervenors' choice of a postulated accident would involve a greater fission products release fraction than would any of the other postulated accidents. According to the record, the referenced SNAPTRAN tests involved the destruction of a reactor at about 1100 degrees centigrade. See Table V following paragraph 62 of the Initial Decision for radiation dosages calculated as a consequence of the postulated accident favored by Morningside and Riverside.

Subparagraph 29(a) recites statistical information about bombings and related incidents in New York City in 1968, 1969 and the first four months in 1970. Subparagraph 29(b) calls attention to the consequences of social unrest on the applicant's campus in April and May 1968 and in early 1970. These recitals are associated with the possibility of sabotage to the reactor. While recognizing the possibility of attempts at sabotage upon the applicant's reactor, the Licensing Board does not number among the credible acts of sabotage the sort of accident which the intervenors propose at paragraph 27. See paragraphs 53 through 55 of the Initial Decision.

The details of the applicant's security measures referenced at subparagraph 29(c) are matters for specific checking by the regulatory staff, particularly its Division of Compliance. The Licensing Board is satisfied that the applicant has the will to proceed with a suitable security program. At paragraph 70 B. of its Initial Decision, the

Licensing Board identifies a particular security matter which it believes deserves further attention. Security measures as well as other operating procedures are subject to change, development and improvement as experience is accumulated.

Subparagraphs 29(d) and (e) and paragraphs 30 and 31 are directed toward supporting the intervenors' choice of a postulated accident. The Licensing Board's views on the subject material are indicated at paragraphs 54 and 55 of the Initial Decision.

Applicant's Conduct During
the Pending of the Proceeding

Paragraph 32, including subparagraphs (a), (b) and (c), and paragraphs 33, 34 and 35 raise points which have little or no relevance and no consequence to the proceeding.

Applicant's Failure to Meet the
Criteria for Population Radiation
Exposure of the Federal Radiation
Council

Paragraph 36 is unacceptable. The Licensing Board has no occasion to make an interpretation of its own as to whether the cited criteria of the Federal Radiation Council are being adhered to. The Licensing Board is guided by direction from AEC and the latter's regulations. In the Licensing Board's view, the risk vs. benefit factor associated with the Federal Radiation Council's criteria is implicit in the AEC regulations.

Others

Paragraph 37 recognizes that the applicant's reactor has a capability of pulsing to peak power levels of approximately 250 megawatts. Such levels are reached on a split-second basis. Note is made of this capability at paragraph 36 of the Initial Decision. See also paragraphs 42 and 70 E. of the Initial Decision.

Paragraph 38 is a correct statement but also an incomplete one, failing to note that under AEC regulation no statement on environmental considerations pursuant to the National Environmental Policy Act of 1969 is required of the applicant.

ATTACHMENT E

Board's Position
With Respect to
Proposed Conclusions of Law of
Morningside Renewal Council, Inc. and
Riverside Democrats, Inc.

Morningside Renewal Council, Inc. and Riverside Democrats, Inc. jointly submitted amended proposed conclusions of law following the July 10, 1970 hearing. These conclusions superseded corresponding ones previously submitted on a joint basis following the November 18-20, 1969 hearing session. The amended proposed conclusions, which number nine, are supported by a brief. The Licensing Board's position with respect to the nine conclusions is set out below in the order presented by the intervenors.

Initial Decision

Conclusion No. 1

This broadside conclusion attempts to relate certain of the intervenors' proposed findings of fact to specified provisions of AEC regulations, the findings being regarded as indicative that the regulatory provisions were not complied with. The conclusion is rejected, except to the extent indicated by the Licensing Board in its own conclusions as being a mixture of unacceptable proposed findings and misconstruction of regulations. The Licensing Board's position on individual proposed findings of the intervenors is indicated at Attachment D.

The intervenors' conclusion cites seven provisions of the AEC regulations in Title 10 of the Code of Federal Regulations (CFR). A comment about each of these seven provisions in the context of the present proceeding follows:

Section 50.30(c)(2) sets forth filing and distribution requirements for updating an application for a license covering certain facilities other than research reactors like the applicant's Triga. In any case, the intervenors were not prejudiced by any lack of information concerning the applicant's reactor, its intended operation and the scope of the proposed license.

Section 50.34, which is captioned "Contents of applications; technical information," is divided into two parts, namely (a) Preliminary safety analysis report and (b) Final safety analysis report. The former part identifies minimum information for inclusion in an application for a construction permit. The latter

part describes information for inclusion in an application for an operating license. The Licensing Board has no occasion to fault the subject application, particularly as supplemented by other evidence of record, for non-compliance with section 50.34.

Section 50.35 is entitled "Issuance of construction permits." The notice of hearing states that construction of the applicant's reactor was authorized by Construction Permit No. CPRR-78 issued December 30, 1963. The present proceeding concerns a proposed operating license. Paragraph (c) of section 50.35, which appears to be the only part of the section pertinent in this proceeding, states that any construction permit will be subject to the limitation that a license authorizing operation of the facility will not be issued until (1) the applicant has submitted the complete final safety analysis report and (2) the Commission has found that the final design provides reasonable assurance that the health and safety of the public will not be endangered by operation of the facility in accordance with the license and AEC regulations. The Licensing Board's role is to decide whether to authorize the issuance of an operating license on the basis of its answers to the noticed issues, which answers are to be founded on the record of the hearings. The record of the hearing includes the applicant's final safety analysis report and the noticed issues include the second condition of paragraph (c) of section 50.35.

Section 50.36 is entitled "Technical specifications." The section indicates the coverage of proposed technical specifications which ought to

accompany an application for an operating license. As part of its application, the applicant did submit proposed technical specifications to the regulatory staff and they are part of the hearing record along with the application. The board, however, is concerned with the technical specifications incorporated into the license proposed by the regulatory staff -- the subject matter of the proceeding. The Licensing Board has no objections to these latter specifications and has no occasion to fault the applicant for non-compliance with section 50.36.

Section 50.40, entitled "Common standards," sets down general standards to be considered in determining whether a license will be issued to an applicant. These standards restate the issues in the notice of hearing and indicate certain general factual data which ought to be taken into account and which, in fact, were taken into account in the course of the proceeding.

Proposed Appendix E of Part 50 is entitled "Emergency Plans for Production and Utilization Facilities." It was published by the Commission in the May 21, 1970 issue of the Federal Register with a request for comments thereon by July 20, 1970. On January 23, 1971, the proposed Appendix E, with certain modifications, became a part of the body of AEC regulations. At the hearing on July 10, 1970, the regulatory staff testified that the applicant met the intent of the then proposed Appendix E. It is the Licensing Board's position that prior to any issuance of a license to the applicant, the regulatory staff should

satisfy itself as to the applicant's compliance with current substantive requirements of the Commission regarding plans and procedures for coping with emergencies. See paragraphs 32 and 70 D. of the Initial Decision.

Part 20 establishes standards for protection against radiation hazards arising out of activities under licenses issued by the Commission. For purposes of this proceeding, Part 20 standards relate to the noticed issue of whether there is reasonable assurance that operation of the applicant's reactor under the conditions and limitations proposed can be conducted without endangering the health and safety of the public. In the Licensing Board's view, the answer is affirmative. The intervenors err in attempting to use the Part 20 standards as a measure of maximum limits of radiation exposure under postulated accident conditions. See paragraph 59 of the Initial Decision.

Conclusion No. 2

The intervenors conclude that the proponents of the license have failed to establish that the health and safety of the public will not be endangered under accident conditions. The intervenors refer to 10 CFR 50.40 at subparagraph (a). In the Licensing Board's construction of the regulation, subparagraph (c), rather than (a), relates to circumstances of a postulated accident. In any event, the Licensing Board's position with respect to the intervenors'

conclusion and the basis thereof are set forth at paragraphs 49 through 62 and at paragraph 69 of the Initial Decision. Also, see earlier comment in this Attachment about the scope and relevance of Part 20 standards.

Conclusion No. 3

With respect to the intervenors' conclusion concerning their proposed accident for safety calculation purposes, the Licensing Board refers again to paragraphs 49 through 62 and paragraph 69 of the Initial Decision.

Conclusion No. 4

The intervenors conclude that the applicant has failed to establish, in accordance with 10 CFR 50.40(c), that the issuance of the proposed license to applicant will not be inimical to the common defense and security or to the health and safety of the public. The intervenors rely on the same reasons for this conclusion as they had relied on for their three previous conclusions. The Licensing Board's views on the substance of the intervenor's conclusions and supporting contentions have already been noted. Similarly, the Licensing Board has already noted its distinction between the health and safety issues at subparagraphs (a) and (c) of 10 CFR 50.40 -- corresponding to the difference between two parallel issues in the notice of hearing. The board rejects the intervenors' conclusion regarding the common defense and security issue on the basis of its finding at paragraph 33 of the Initial Decision. With respect to this issue, the intervenors offered no evidence and proposed no finding of fact.

Initial Decision

Conclusion No. 5

The intervenors conclude that the applicant has failed to satisfy the requirements of 10 CFR 50.40(a) and (c) as a result of its failure to meet the criteria for population exposure of the Federal Radiation Council. This conclusion is rejected. The Licensing Board is not required to make a separate evaluation of its own regarding conformance or non-conformance with Federal Radiation Council policy statements. Following the Commission's direction and regulations, the Licensing Board addresses itself to those issues set out in the notice of hearing. Further, in its Memorandum of August 8, 1969 in the *Matter of Baltimore Gas and Electric Company*, the Commission noted as follows (p.4) : "The Commission's Part 20 standards are based on recommendations developed by the statutory Federal Radiation Council and approved by the President for the guidance of Federal agencies."

Conclusion No. 6

The intervenors conclude that the applicant's reactor is a testing facility within the meaning of 10 CFR 20.2(r)(1) and cannot be placed in a densely populated center.

The Licensing Board rejects the first part of the above conclusion on the authority of the Atomic Safety and Licensing Appeal Board's negative response of May 26, 1970 to the Licensing Board's certified question of April 6, 1970 asking whether the applicant's reactor is a testing facility according to the definition at 10 CFR 50.2(r)(1). The second part of the intervenors' conclusion, being

dependent on the first part, is also rejected. The Licensing Board notes that whether the applicant's facility is or is not a "testing facility" does not of itself determine whether such facility may be placed in a densely populated area.

Conclusion No. 7

The intervenors conclude that an operating license may not be issued pending compliance with the procedures of the National Environmental Policy Act of 1969 (NEPA).

As a component of the AEC, the Licensing Board looks to the Commission for direction with respect to the implementation of statutes which may have a bearing upon decisions within the Licensing Board's authority. With respect to the NEPA, the Commission issued implementing regulations, namely, Appendix D to 10 CFR 50, entitled "Statement of General Policy and Procedure: Implementation of the National Environmental Policy Act of 1969 (Public Law 91-190)." By its terms, Appendix D applies only to applications for construction permits and operating licenses for nuclear power reactors and fuel reprocessing plants and to other proceedings "when the Commission determines that the proposed action is one significantly affecting the quality of the human environment." Since the applicant's Triga reactor is neither a nuclear power reactor nor a fuel reprocessing plant and since the Commission has made no determination which would bring the present matter within the scope of Appendix D, the Licensing Board concludes that the Commission has decided that no special procedures are called for by NEPA with respect to the present proceeding.

Initial Decision

Conclusion No. 8

This conclusion alleges that, "Certain actions of the applicant have tended to undermine respect for the Commission and discourage the full and informed public participation in these proceedings intended by 10 CFR 2.751 and 50.30(c)(2)..." Section 2.751 of the Commission's regulations simply provides that, with certain exceptions inapplicable here, all hearings will be public. Section 50.30(c)(2), as noted before, pertains to updating an application for a license covering certain facilities other than a research reactor like the applicant's Triga. The intervenors' conclusion, which rests on overstated contentions, is irrelevant to the issues in the proceeding.

Conclusion No. 9

The intervenors' final proposed conclusion is that, "An order denying the application for issuance of an operating license is being issued." The Licensing Board's own order denies authorization for the issuance of an operating license for the reason stated therein and for none other. See paragraph 71 of the Initial Decision.

DECISION OF ATOMIC SAFETY AND LICENSING BOARD DATED MAY 18, 1972

DOCKET NUMBER
PROD. & UTIL. FAC. 50-208

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD:

Algie A. Wells, Chairman
Dr. John H. Buck
Dr. Lawrence R. Quarles

DOCKET NO. 50-208

IN THE MATTER OF

TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK

DECISION

This proceeding is before us on exceptions taken by the applicant, the staff, and certain intervenors to the

Decision

Initial Decision of the Atomic Safety and Licensing Board, dated April 6, 1971. The review function in this matter is vested in the Atomic Safety and Licensing Appeal Board. (10 CFR Section 2.785(a)(3); see notice, 34 F.R. 14302, September 11, 1969.)

The applicant in this proceeding seeks an operating license for a Triga Mark II nuclear reactor located on the Columbia University campus in the Morningside Heights area of New York City. This research reactor is a heterogeneous pool-type reactor cooled by water, moderated by zirconium hydride and water, and designed to be operated in a steady-state condition at power levels up to 250 kw(thermal). It also incorporates the capability to conduct experiments involving rapid insertions of excess reactivity which result in split second pulses at peak powers of approximately 250,000 kw.

In the Initial Decision, the Licensing Board declined to decide whether issuance of the proposed license will be inimical to the health and safety of the public; and, accordingly, it denied authorization to the Director of Regulation to issue the requested operating license. In reaching this decision, the Board found reasonable assurance that, under normal operating conditions (both steady-state operation and pulse mode operation), the reactor could be operated without endangering the health and safety of the public; but stated it could not, on the basis of the record, conclude whether, under a postulated reactor accident, the health and safety of the public would be endangered. As a rationale for this position, the Licensing Board took particular note of the absence of applicable substantive criteria and standards for evaluating

a postulated accident, and the conflict in data which appeared on the record concerning the fission products release fraction under postulated accident conditions. (Initial Decision, par. 69).

Exceptions to the Initial Decision were filed by the applicant on May 7, 1971, by the AEC regulatory staff on May 10, 1971, and by intervenors, Morningside Renewal Council, Inc., and Riverside Democrats, Inc., on April 26, 1971. The staff has filed a response to the intervenors' exceptions, and the intervenors filed a response to the applicant's and staff's exceptions. Additional material described below has been filed in the appellant proceeding.

In brief, the parties on appeal have asserted the following positions:

1. The applicant urged the Commission, in ruling on exceptions filed in this proceeding, to establish the standards for evaluating postulated accidents for research reactors which the Licensing Board found necessary for it to make a public health and safety determination. The applicant also urged that the Commission conduct, or make arrangements to have conducted, an additional experiment relating to the fission products release fraction.

2. The AEC regulatory staff took the position that the record in the proceeding was sufficient to enable the Licensing Board to make a public health and safety finding and, accordingly, that the operating license should have been authorized on the basis of the record before the Board. The staff urged that general site standards and criteria are not necessary to evaluate the merits of a specific license application for a Triga reactor; that the

safety evaluation could be based on engineering evaluations and the exercise of judgment with respect to the possible effects of the operation of the facility on the public health and safety as well as experience gained from the design, construction, and operation of prior reactors; and, finally that a new experiment was not necessary, since the values of release fractions of fission products from the fuel under postulated accident conditions need not be known with precision to make a safety evaluation and the record was more than sufficient to support a favorable safety finding.

3. The intervenors took exception to the "maximum credible accident" [1] adopted by the Licensing Board; to the failure of the Board to determine whether the ventilation systems should be left open or shut in the event of an accident; to the Board's ruling that it lacked authority to weigh the benefits or lack thereof which may be derived from the proposed operation of the reactor; to the failure of the applicant to present evidence on, and the Board to consider, the method of transporting and storing irradiated fuel used in the reactor; to the failure of the Licensing Board to find that the proposed reactor is a "testing facility" and that such a facility may not be placed in a densely populated area; and to the failure of the Board to require compliance with the procedures of the National Enviornmental Policy Act of 1969 (NEPA), and in particular the preparation of an enviornmental report, as a condition for authorizing the grant of an operating license.

1. See footnote 2 for description of the relationship between a "maxmimum credible accident" and a "design basis accident".

Decision

In our Memorandum of June 14, 1971, following review of the entire record of the proceeding submitted prior to that date, we concluded that further clarification of the record was necessary in three areas. The first of these areas concerned experimental data regarding the fission products release fraction under accident conditions, and we asked that further evidence be presented to reconcile possibly conflicting data which appeared in the record of the proceeding. With respect to the other areas, which concerned the criteria for evaluation of postulated accident effects, and the protective measures which were to be used to protect the reactor against industrial sabotage or damage or destruction as a result of civil disturbance, the Appeal Board asked the parties to provide briefs and/or oral argument.

Following the submission of briefs, a proceeding to receive the additional evidence requested and to hear oral argument on the matters covered by the June 14, 1971, Memorandum, was conducted by the Appeal Board on October 27, 1971. All parties that had filed exceptions appeared at this proceeding. In addition, Mrs. Mary Hays Weik, an intervenor before the Licensing Board who had kept in communication with the Appeal Board concerning this proceeding, participated in this session.

By letter dated October 12, 1971, intervenors filed a Motion for Leave to Introduce New Evidence. That Motion primarily sought leave to have Dr. Ernest J. Sternglass present evidence at the October 27, 1971, proceeding concerning recent research on infant mortality rates near certain Triga reactors. The Appeal Board subsequently agreed to accept Dr. Sternglass' material as

an offer of proof on whether a substantial question was presented as to the adequacy of the standards of 10 CFR Part 20, as applied to Triga reactors, to protect the public health and safety. Dr. Sternglass presented his testimony at the October 27, 1971, proceeding and was subject to cross-examination. Rebuttal evidence was presented by the applicant, and by the staff through affidavits. At a further proceeding conducted on February 15, 1972, in which all of the participants in the October 27, 1971, session also participated, the affiants were subject to cross-examination, and certain additional surrebuttal testimony offered by Dr. Sternglass was received. The participants in the appellate proceeding have filed proposed supplemental findings and conclusions, and the Morningside and Riverside intervenors have filed a supplemental brief.

The Appeal Board has reviewed the entire record of this proceeding, including the exceptions and responses thereto filed by the parties, and the additional evidence and submissions made to the Appeal Board during the appellate proceeding. We are of the view that resolution of the issues outlined in our June 14, 1971, Memorandum, together with the other questions considered during the appellate stage of this proceeding, provides an adequate basis for our making the public health and safety determination which the Licensing Board declined to make. We have also determined that the provisions of the National Environmental Policy Act of 1969 (NEPA) relating to the preparation of an environmental report are not applicable to the licensing of this reactor. Accordingly, we have concluded that an operating license may be issued to the applicant, subject to the conditions set forth below.

Decision

Following are our reasoning and conclusions with respect to the issues which have been presented for our consideration.

1. Postulated Accident

The Licensing Board, in its Initial Decision, correctly observed that consideration of the applicant's reactor under accident conditions bears upon the issue of whether the issuance of the proposed license will be inimical to the health and safety of the public. (Initial Decision, par. 49) To evaluate the maximum effect of an accident on the public health and safety, it is necessary, as the Licensing Board pointed out, both to postulate an accident which would result in potential hazards not exceeded by those from any accident considered credible, and to ascertain the fission products release fraction which will result from such an accident. [2]

2. In the record of this case we find the terms "maximum credible accident" and "design basis accident" used apparently interchangeably. This comes about as a result of changing terminology which has occurred during the period of time since the filing of the initial Columbia application for a reactor construction permit. At the time of the initial application for this reactor (May 1963) the term "maximum credible accident" was in common use, primarily as the result of its use in TID-14844 ("Calculation of Distance Factors for Power and Test Reactor Sites"). This document, published in March 1962, discussed an analytical method for analyzing the consequences of a major reactor accident of a type which they called the maximum credible accident.

About 1967 the term "design basis" was brought into use in the discussions of the principal design criteria. At the same time, terminology with respect to possible accidents was changed to consider the design basis accident which would be the maximum accident that the reactor safeguards would be designed to protect against. At the present time the term "design basis accident" is considered to be preferable terminology.

Decision

To deal first with the postulated accident, the Licensing Board accepted the regulatory staff's design basis accident, which consisted of the "failure of the cladding of a single fuel element while exposed to air". It also noted that the applicant's operating procedures provide that the operator shut down the ventilation system under conditions of an accident involving radiation releases; and, after evaluation of the accident, decide whether or not to restart the ventilation system. The Decision included release figures for both situations, but did not specify which condition should be used for evaluating the postulated accident. Intervenors have postulated an accident with fission releases several times that adopted by the Licensing Board. In the opinion of the Licensing Board, they made no showing that such an accident is credible, and we concur.

Intervenors have also taken exception to the failure of the Licensing Board to prescribe whether the ventilation system is best left open or shut in the event of an accident. It is our opinion that, under accident conditions, it is possible that the ventilation system may not be operable. The postulated accident must therefore be considered as occurring, and its hypothetical results evaluated, with the system turned off. Accordingly, we accept the postulated accident adopted by the Licensing Board with the foregoing modification.

2. Fission Products Release Resulting From Postulated Accident

As we have previously noted, evaluation of the effect on the public health and safety of an accident requires that the fission products release fraction under such conditions be ascertained.

Decision

With respect to this question, we pointed out in our Memorandum of June 14, 1971, that the Licensing Board had before it the results of two experiments performed at Gulf General Atomic Inc. (GGA), one in 1960 and the other in 1966. These results gave two release fractions, 9.6×10^{-3} and 3×10^{-6}, respectively, which differed by a factor of more than 10^3. It was for this reason that the Licensing Board recommended that further experimentation be undertaken. Consequently, the Appeal Board was obliged to consider whether a definitive fission products release fraction for Triga reactors was available. Accordingly, in our Memorandum, we asked a number of questions, and elicited additional information, designed to enable us to ascertain whether the differing figures were reconcilable, and whether a definitive fission products release fraction for Triga reactors could be obtained.

Subsequently, on June 18, 1971, the staff transmitted to the Appeal Board for its information, a letter dated June 1, 1971, from Ralph H. Peters of Gulf Energy and Environmental Systems, Inc. (GEES) (GGA's successor) to the Director of the AEC Division of Reactor Licensing, forwarding material describing an error GEES had found in the 1960 experiment.[3] GEES found its recalculated release fraction to be between 6.1×10^{-5} and 8.0×10^{-5} and, although somewhat higher than the 1966 result, to be in "reasonable agreement" with the release data obtained in 1966.

Furthermore, GEES performed additional experiments during the summer of 1971 to obtain additional data

3. This material was formally incorporated into the record at the October 27, 1971, proceeding.

concerning the appropriate fission products release fraction. The results of the additional experiments also were incorporated into the record at the October 17, 1971, proceeding. GEES first repeated the 1960 experiments and obtained a release fraction normalized to a standard Triga element of 0.5×10^{-5}. A new 1971 experiment, also normalized to a standard Triga element, gave a release fraction of 0.8×10^{-5}.

The applicant and staff have provided satisfactory answers to questions asked in the June 14, 1971, Memorandum. GEES reports inserted in the record, together with the answers to our questions, provide data corroborating portions of the GEES experiments. Reviewing the data on all the experiments, together with the related information corroborating certain of the results of these tests, the Appeal Board agrees with the conclusion of GEES Report A10801 that these experiments have provided release fraction data that are reasonably consistent. We also find that the release fraction of 1.5×10^{-5} proposed by the applicant and staff in this proceeding is an appropriately conservative figure for use in evaluating results of a postulated accident involving a Triga reactor of the type under consideration.[4]

In their exceptions, and during the course of the October 27, 1971, proceeding, the intervenors questioned

4. This release fraction is five times that ascertained in the 1966 experiments, three times that ascertained in the rerun of the 1960 experiments, and twice that ascertained in the 1971 experiments.

the independence and, inferentially, the validity of the 1971 experiments. They contended that the experiments should have been performed by the Commission itself (as suggested by the Licensing Board in its Initial Decision), rather than by GEES, the manufacturer of the reactor. The 1971 experiments were monitored by two Commission representatives, one of whom appeared at the October 27, 1971, hearing and indicated that it was a high quality experiment and that he had a high degree of confidence in the release fraction. (App. Tr. 102) Moreover, we find nothing of record to undermine the validity of the results of the 1971 experiments. This is particularly true in view of the recalculation of the 1960 experiment which indicated substantial agreement among the results of all the experiments. While the Appeal Board, under some circumstances, might be sympathetic to the suggestion that independent experiments should be performed by the Commission, we see no reason to impose any such requirement in the particular circumstances of this case. To the extent that intervenors' exceptions advocate a different conclusion, they are hereby denied.

Using the release fraction of 1.5×10^{-5}, and under the hypothetical postulated accident conditions which we are adopting (see part 1 of this Decision), radiation doses would exceed the exposure limits of 10 CFR Part 20 only at the truck door in the parking area. [5] If this door were sealed to reduce substantially the airflow around the door,

5. 10 CFR Part 20 sets forth maximum releases of radiation permitted during normal operation of research as well as other reactors. In the following section of this Decision, we discuss 10 CFR Part 20 in relationship to the postulated accident.

the radiation at that location would be reduced to a level below the limits of 10 CFR Part 20. (App. Tr. 109) As a condition of the operating license which this Decision will authorize to be issued, the applicant will be required to have the truck door in the parking area sealed with rubber tape during all periods of time in which the reactor is in operation.

3. Criteria for Evaluation of Postulated Accident Effects

As we have pointed out, the Licensing Board's failure to reach a health and safety conclusion was predicated in part on what it described as "the absence of applicable substantive criteria of the Commission and of convincing objective standards of the regulatory staff" for evaluating the effects of a postulated design basis accident. Accordingly, in our June 14, 1971, Memorandum, we asked for briefs and/or oral argument on this matter.

Our review of the material submitted leads us to the conclusion that Part 100 is not applicable to research reactors and hence to this proceeding, and that there are no other Commission regulations which specifically define the criteria for evaluating the effects of a postulated design basis accident of a research reactor. Under the circumstances of this case, however, the absence of regulations specifically formulated for this purpose is not an impediment to reaching a conclusion as to whether the health and safety of the public will be endangered by the occurrence of a postulated accident to the reactor. In the discussion of the fission product releases in the preceding section, we indicated that, under the conditions we are

imposing, radiation releases from the postulated accident would be below the limits for normal operation set forth in 10 CFR Part 20. Since the Commission has determined that these very low releases are acceptable for normal operation, they are clearly acceptable in a postulated accident situation. (See App. Tr. 250, 256) Under those circumstances, we find that the health and safety of the public will not be endangered by the occurrence of a postulated accident to the reactor. [6]

As a general proposition, the Appeal Board does not consider it desirable to use the standards of 10 CFR Part 20 for evaluating the effects of a postulated accident in a research reactor inasmuch as they are unduly restrictive for that purpose. The Appeal Board strongly recommends that specific standards for the evaluation of an accident situation in a research reactor should be formulated. We do not believe that the internal standards referred to by the staff are an appropriate substitute.

4. Protective Measures

In our Memorandum of June 14, 1971, we requested the applicant, through oral argument and through a brief if it desired to submit one, to address itself to the sufficiency of the physical security measures it proposed to adopt. We did this since we are of the opinion that the physical security

6. We note in this connection that this approach is eminently practical. Thus, the Licensing Board in this proceeding reviewed data concerning nine accidental releases of fission products at Triga reactors and found that none of the releases resulted in concentration in unrestricted areas in excess of 10 CFR Part 20 limits for continuous exposure. (Initial Decision, par. 40.)

of the reactor must be such that there is reasonable assurance that the public health and safety will not be compromised as a result of willful damage or destruction. In response, the applicant presented testimony at the proceeding on October 27, 1971, by Dr. William W. Havens, Jr., Director of the Division of Nuclear Science and Engineering at Columbia University. Dr. Havens' October 27, 1971, testimony on protective measures was supplementary to testimony which he had earlier presented to the Atomic Safety and Licensing Board. In addition, the regulatory staff, in a statement dated October 12, 1971, analyzed the evidence presented to the Licensing Board on this subject, and provided its views as to the adequacy of the proposed system.

As a result of this material, and particularly Dr. Havens' answers to questions on cross-examination, and his responses to questions of the Appeal Board, it is apparent that the applicant is placing primary reliance for the effectiveness of its security system on the use of special magnetic keys. Dr. Havens testified that, from outside the reactor building, at least two different magnetic keys are required to get into either the reactor room or the control room. The number of keys to the control room is limited – quite properly, we might note – to responsible faculty members and the Reactor Supervisor. Control room keys are not given to graduate students. (App. Tr. 273) In contrast, however, Dr. Havens also indicated that keys to the reactor room would be considerably more numerous, and would be distributed ("on a 'need' basis only") to graduate students as well as faculty members who are working with the reactor or performing experiments associated with it. (Prepared Testimony, p.4; App. Tr. 263)

Decision

The applicant further indicated that during off-hours all doors except one to the building in which the reactor is located are supposed to be locked, and that at present a guard is stationed near the one door available for entrance during off-hours. Dr. Havens stated that the University did not plan to have a physical security alarm system, since it did not believe such a system was necessary. (App. Tr. 274)

The Appeal Board recognizes the desirability of maintaining relatively free access to the reactor room for research by students and faculty. We are concerned, however, with the possibility that lost or stolen keys, coupled with the lack of assurance of effective guard control, and the absence of any physical security alarm, may give easy access to the reactor room during off-hours to unauthorized persons. With these factors in mind, the Appeal Board has concluded that the operating license which we are authorizing in this Decision must include specified conditions designed to enhance the physical security of the reactor. Unfortunately, as in the case of standards for evaluating the effects of a postulated accident in research reactors,[7] there are no standards available for evaluating the physical security of a research reactor, and it is necessary for us to establish conditions for the purpose of providing reasonable assurance that the public health and safety will not be compromised by willful damage or destruction. These conditions, which appear in the Appendix to this Decision, are intended to limit the availability of keys and the likelihood of their loss or theft, and to require installation of a physical security alarm system.

7. See Part 3 of this Decision.

Decision

5. Challenge to 10 CFR Part 20— The Sternglass Testimony

Intervenors Morningside Renewal Council, Inc. and Riverside Democrats, Inc. at the October 27, 1971, proceeding, presented testimony by Dr. Ernest J. Sternglass of the University of Pittsburgh, regarding infant mortality rates near certain Triga reactors. Rebuttal testimony on this subject was presented by the applicant and by the regulatory staff at the proceedings on October 27, 1971, and February 15, 1972. At the latter session, Dr. Sternglass responded to the rebuttal testimony.

By way of procedural background, the intervenors' motion dated October 12, 1971, sought leave to introduce testimony by Dr. Sternglass. Accompanying the motion was a document summarizing Dr. Sternglass' allegations.[8] We viewed those allegations as a contention—which had heretofore not been raised as part of the appellate consideration of this case—that the standards of 10 CFR Part 20, as applicable to research reactors, are inadequate to protect the public health and safety. In view of the possible safety implications if the allegations were correct, we agreed to receive the proposed testimony as an "offer of proof, provided that [it] includes sufficient substantive data, and analysis thereof, which would enable us to evaluate the conclusions stated by Dr. Sternglass."[9]

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8. "Summary of Testimony of Dr. Ernest J. Sternglass", dated October 7, 1971.

9. Appeal Board Memorandum and Order, dated October 15, 1971.

Thereafter, a further statement was filed with the Appeal Board, and a further supplement was handed out on the morning of October 27, 1971, just prior to the oral proceeding. [10]

In view of the fact that there was not then sufficient time for examination of the documents, the Appeal Board deferred ruling on their admissibility but permitted Dr. Sternglass to testify and be cross-examined. The Appeal Board further permitted the applicant and staff to offer rebuttal evidence, in part through affidavits, subject to a later ruling on admissibility and subject to cross-examination of the affiants. Later, in our Memorandum and Order of November 22, 1971, we noted that the material presented by Dr. Sternglass "at best can only be said marginally to meet the threshhold standards" we had adopted; but we agreed, in view of the importance of the matter, to consider whether it raised a "substantial question", within the meaning of the Baltimore Gas and Electric Co., ruling, as to whether the Commission's regulations in 10 CFR Part 20 are a "reasonable exercise of the broad discretion given to the Commission by the Atomic Energy Act for implementation of the statute's radiological safety objectives."[11] We also agreed to hold a hearing, if requested, for cross-examination of the

10. The statement was entitled, "Infant Mortality and Prematurity in the Neighborhood of Nuclear Testing Reactors", and was dated October 22, 1971; the supplement was entitled, "Appendix Supplementary Material Relating to the Patterns of Infant Mortality near a Nuclear Testing Reactor in Urbana, Illinois."

11. In the Matter of Baltimore Gas and Electric Co. (Calvert Cliffs' Nuclear Plant, Units 1 and 2, Docket Nos. 50-317, 50-318), Commission Memorandum dated August 8, 1969.

individuals who had provided affidavits responding to Dr. Sternglass' testimony. Cross-examination having been requested, a hearing was held on February 15, 1972, and included further testimony of Dr. Sternglass in reply to that furnished by the affiant. [12]

After detailed study of the Sternglass testimony, including his oral and written statements his answers to questions on cross-examination, the rebuttal testimony of the applicant and staff, and Dr. Sternglass' reply, we have concluded, for reasons which we describe in greater detail below, that Dr. Sternglass' allegations are not substantiated by the facts which he has presented in their support, and are premised at best on a highly questionable use of those facts. Accordingly, no basis has been presented which could lead us to conclude that adoption by the Commission of the standards of 10 CFR Part 20 for use with respect to Triga reactors was an abuse of the broad discretion which it has under the Atomic Energy Act in implementing the statute's radiological safety objectives.

Although under cross-examination he modified his views, Dr. Sternglass' initial allegation is summarized at the outset of his prepared testimony dated October 22, 1971:

> "After examining the changes in infant mortality and immature births in association with the known onset of operation and radioactive releases from

12. "Reply to Rebuttal Testimony in the Matter of the Columbia University Reactor Proceedings before the Atomic Safety and Licensing Appeal Board, Docket No. 50-208", dated January 6, 1972.

> testing reactors of this [the Triga] type in three separate locations, it is concluded that there exists a substantial probability that the operation of these reactors has let to significant rises in infant mortality and underweight births in the areas in which they are located." (Emphasis supplied)

His modified view appears to be that his data is "highly suggestive of a very serious possible problem" (emphasis supplied) so as to justify "a much further detailed investigation" of these matters. (App. Tr. 224, 227)

In support of both his initial hypothesis, and the modified view which he later adopted under cross-examination, Dr. Sternglass attempts to analyze data concerning infant mortality rates in areas surrounding the Penn State Reactor in State College, Pennsylvania, the University of Illinois reactor in Urbana, Illinois, and the reactors at the research laboratories of Gulf-General Atomic Corporation in San Diego, California. As we understand it, Dr. Sternglass assumes that the actual fission product releases for these Triga reactors fall within the limits imposed by the standards of 10 CFR Part 20. But he questions those standards on the basis that infant mortality rates in these areas have failed to decline as rapidly as those rates in certain "control" cities or areas. Specifically:

> 1. With respect to State College, Pennsylvania, he asserts that during the period 1962-1969, the infant mortality rate for that town rose sharply but that it declined steadily for the "control" city of Lebanon, Pennsylvania. He uses the rate for 1962 as a reference

and points out that the rate of infant mortality at State College rose to 2.29 times that value in 1968, and to 1.26 times the 1962 value in 1969, whereas in Lebanon the rate in 1968 declined to 0.48 times the 1962 rate, and the rate in 1969 declined to 0.29 times the 1962 rate.[13] He also points out "two clear peaks" of infant mortality rates in State College in 1965 and 1968 and asserts that there is no parallel either in Lebanon or Pennsylvania as a whole. He evaluates these peaks as significant in that they "occur in exactly the same year as the measured peaks of beta activity discharged" from the reactor.

With respect to immature births at State College, Dr. Sternglass finds a peak "at the time of large-scale nuclear testing in 1962-63", followed by a gradual decline "typical for most areas of the United States in the mid-60's", a sharp halt and reverse in the decline "the year after the first large release" (1966), a further increase "as the activity gradually entered the environment", and a return to the normal downward trend with the "sharp drop in releases" which occurred in 1969.

For reasons which we shall hereafter state in greater detail, the Appeal Board has concluded that use of Lebanon as a control city, and 1962 as a base year, is inappropriate; that the infant mortality and immaturity rates for State College are within the range of random variation as compared to the State of Pennsylvania as a whole, or counties within the state;

13. October 22, 1971, Statement of Dr. Sternglass, Table V.

and that the State College rates do not reflect any correlation with the State College reactor so as to create any inference that the Part 20 standards as applied to Triga reactors may be deficient.

2. With respect to the Urbana, Illinois area, Dr. Sternglass compares the infant mortality rate in Champaign rate in Champaign County, Illinois, with the combined rate for three adjacent counties (McClean, Platt and Moultrie). He finds "anomalous rises of infant mortality" in Champaign County in 1965 ("during the time when the Mark II Triga reactor was raised on its full power level . . . and an accidental release of fission products occurred") over the rate for 1950-1952 ("before the heavy testing of nuclear weapons that began in 1951 could have had an effect"). The year 1950 is used as a base year for this particular example.

As in the case of the Penn State reactor, the Appeal Board has been unable to find in the figures relied on by Dr. Sternglass any evidence of higher-than-normal infant mortality, and no evidence of any association between infant mortality rates and the operation of the Triga reactor.

3. With respect to the San Diego, California area, Dr. Sternglass asserts that for the years 1959-1968, rises in infant mortality in San Diego County relative to California as a whole took place "within a year after the prototype advanced Triga reactor went into operation, peaking the year following the reported release of fresh fission products from a damaged fuel

element in 1963", and that the infant mortality did not decrease again towards the value for California as a whole "until after shutdown following the second accidental release in 1965".

As described in greater detail below, the Appeal Board finds no significant discrepancy between the overall trend of infant mortality rates in San Diego County and California as a whole, no correlation between accidental releases and peaks of infant mortality, and no showing that the operation of Triga reactors in San Diego County had any effect whatsoever on infant mortality rates.

While Dr. Sternglass' analysis appears to be premised on figures derived from the three specific Triga reactors discussed, Dr. Sternglass states in his reply of January 6, 1972, that "the evidence for unexpectedly severe effects of low-level radiation on health, especially serious for the case of the early embryo and developing infant in utero, rests on far more extensive evidence than that represented by the data for the three research reactors that are the subject of the present discussion." Other than referring in general terms to prior studies of his own and other studies, which focused on areas adjacent to certain power reactors, Dr. Sternglass has provided no data concerning other reactors, particularly no other Triga reactors. Our evaluation of the present allegations of Dr. Sternglass in this proceeding has been based on the information concerning the three Triga reactors appearing in the record. In any event, we note that the methodology employed by Dr. Sternglass in his evaluation of the effects of Triga reactors appears to be similar to that which he

used in those other studies involving power reactors which he has referenced in this proceeding.

As we have earlier indicated, the Appeal Board is of the opinion that Dr. Sternglass' assertions have no valid scientific foundation. We find that the methodology employed is deficient, that many of the assertions are inconsistent and even self-contradictory, and his statistical methodology and selective sampling techinques are not scientifically credible. Some of the more serious deficiencies in methodology in Dr. Sternglass' testimony which we have taken into account in reaching these conclusions are as follows:

1. The base years chosen by Dr. Sternglass against which to plot changes in infant mortality rates for the three reactors show no internal consistency and no meaningful rationale for their choice. For example, 1962 was chosen as the base year for measuring effects of the Penn State reactor for the stated reason that it represented "the end of nuclear testing by the U.S., U.S.S.R. and Britain". In his reply (p.10), Dr. Sternglass further commented (with respect to the Penn State reactor) that:

> "the year chosen must be as late as possible after the large test-series in Nevada producing heavy amounts of fallout, with concentrations in rain and river water often equalling or exceeding the activities releases from the reactor. On the other hand, the reference year must be as early as possible before large releases from the reactor began . . . ".

Infant mortality at State College purportedly rose because of the effects of the reactor, but the record indicates that a reactor began operation in 1955 (although release data was not available until 1959).[14] Moreover, the record also indicates that the incidence of fallout remained high through 1963, after the end of nuclear testing; indeed, Dr. Sternglass himself acknowledged that the "radioactivity levels of various isotopes such as strontium 90, cesium 137, actually continued to be high through 1963 and began declining then." (App. Tr. 167) The use of 1962 as a base year for measuring alleged effects arising from the Penn State reactor thus appears to have no rationale basis, even accepting Dr. Sternglass' explanation. Dr. Sternglass attempts to rationalize his exclusion of data from the years 1958 and 1959 on the basis of "the large rainouts of 1958-59 containing short-lived isotopes from small weapons," but the record fails to indicate that the fallout in State College during those years was in any way abnormal. Thus, the Appeal Board can find no valid reason for excluding data for years prior to 1962 in which a reactor was in operation and data was available.

On the other hand, the base year chosen by Dr. Sternglass for measuring the Illinois reactor is 1950, ten years prior to the start-up of the reactor ("before the heavy testing of nuclear weapons that began in 1951 could have had an effect"). The base year for measuring the San

14. By way of clarification of material in the record of this proceeding, the Appeal Board notes that, based on official AEC records, which are available in the Commission's Public Document Room, the Penn State Triga Reactor received its operating license in 1965. From 1955 to 1965, Penn State operated a pool type reactor, as to which release data was not available until 1959.

Diego reactor is 1959, the year before the reactor went into operation. No attempt is made by Dr. Sternglass to deal with the fallout phenomenon with respect to the Illinois and San Diego reactors.

A summary of the base years chosen by Dr. Sternglass shows the following relationships:

	Base Year Chosen by Witness	Relationship to end of testing in 1962	Relationship to start-up of reactor
Penn State	1962	same year	7 years after [15]
Illinois	1950	12 years before	10 years before
San Diego	1959	3 years before	1 year before

The particular years chosen by Dr. Sternglass for the various reactors represent years of low infant mortality in the particular locality, against which any increases appear substantial, but the Appeal Board can discern no statistically valid basis for Dr. Sternglass' choosing those years.

2. Dr. Sternglass makes use of inconsistent time lags after which identical effects purportedly appear. For the

15. Three years after discharge records were first available. As previously noted, the Triga reactor at Penn State did not begin operation until 1965, three years after the base year; the earlier reactor was a pool-type reactor.

Penn State reactor, Dr. Sternglass correlates "peaks" in infant mortality (defined as deaths at birth or one year thereafter) in 1965 and 1968 with "measured peaks of beta activity discharged" in the same years, 1965 and 1968. With regard to immature births, where one would logically assume a smaller time lag, Dr. Sternglass suggests that immature births increased in 1966 because of the 1965 release peak (a one-year time lag). Dr. Sternglass also suggests that the drop in immature births in 1969 is attributable to the drop of releases in 1969 (no time lag). Dr. Sternglass attempts to explain the apparent inconsistency by pointing out that most of the releases in 1965 occurred in the last six months of the year, while in 1968 the majority occurred early in the year. The record in fact shows, however, that slightly more than one-half the 1968 releases occurred during the last six months of that year. (App. Tr. 347) The accidental releases shown by Dr. Sternglass to have occurred in 1963 and 1965 for the San Diego reactors appear not to have produced any peaks at all in infant mortality rates for San Diego County. Indeed, those rates seem to have declined both in the years of the releases and in the years thereafter. Although we certainly would not accept this method of analysis, we would note that Dr. Sternglass' method of statistical analysis would apparently lead one to correlate the accidental releases with the decline in infant mortality rates in those years.

3. As in the choice of years, the Appeal Board does not discern any objective, scientific basis for Dr. Sternglass' choice of "control" cities or areas. The record shows, for example, that Lebanon, the "control" city to which State College was compared, bears little similarity to State

College. Lebanon entered the decade of the sixties with an infant mortality rate approximately double that of the town of State College, had a 40% reduction in births during the sixties, and happened to have a smoothly decreasing infant mortality rate during the sixties, as contrasted with much more volatile rates in most other comparably sized cities and counties in Pennsylvania. Moreover, in the case of the other two reactors, Dr. Sternglass makes no attempt to develop comparable control communities. Thus, he compares the infant mortality rate in Champaign County (in which Urbana is located) with the combined rate for three adjacent counties, and he compares the rate for San Diego County with the rate for the entire State of California.

4. Dr. Sternglass has presented no convincing explanation why he chooses to make use of unidentified beta releases rather than the total amount of beta releases. Unidentified beta releases are the product of measuring inadequacies; if measuring techniques were better, there would be no unidentified releases.

5. Dr. Sternglass' assertions concerning hydrology are factually inaccurate. His analysis of the State College area assumes that the reactor releases find their way into the local drinking water. But on cross-examination on his statements that State College got its drinking water from wells (a factually inaccurate statement, for the most part), he admitted that he did not know and had not thoroughly investigated the source of State College's drinking water.

6. Dr. Sternglass' conclusions with respect to the San Diego reactors do not follow from the data appearing in

the record of this proceeding. Dr. Sternglass indicates that within a year after the Triga reactor went into operation, rises in infant mortality took place in San Diego County relative to California, and that after shut-down of the facility following an accidental release in 1965, the rate decreased towards the value for California as a whole. However, the record shows that the reactor shut down for only a few days after the accidental release in 1965 and then resumed normal operations, so that the decline in infant mortality rate after 1965 cannot be attributed to the shut-down of the reactor. The record also shows that during the years in question, and for six of the eight preceding years, the infant mortality rate for San Diego County exceeded that for the State of California, and that the overall trend of change was relatively similar. In addition, the record further shows GEES put a third reactor into operation in 1966, and that the rates for San Diego declined substantially after that time. (App. Tr. 412)

7. Dr. Sternglass appears to ignore the extensive studies of the effects of radiation on varying population groups, including infants, fetuses and pregnant women, which have been carried on over a number of years and are still continuing. As we have previously pointed out, Dr. Sternglass, on cross-examination, conceded that the results he discusses have not been proved, and he modified his allegations from asserting that there was a "substantial probability" to asserting only that there was a "possibility" of the cited effects.[16] While additional study of any scientific matter may, of course, be desirable, the

16. See pp. 19-20, supra.

Appeal Board wishes to note that extensive studies of these matters have been undertaken and are still continuing. [17]

Based on the foregoing, we conclude that Dr. Sternglass' statistical methodology and selective sampling techniques are not scientifically credible and, indeed, raise serious questions as to whether his presentation is consistent with even a moderate degree of scientific responsibility. Accordingly, no basis has been presented which could lead us to conclude that adoption by the Commission of the standards of 10 CFR Part 20 for use with respect to Triga reactors was an abuse of the broad discretion which it has under the Atomic Energy Act in implementing the statute's radiological safety objectives.

6. Miscellaneous Questions

Intervenors have raised exceptions regarding a number of rulings of the Licensing Board which are reflected in the Initial Decision. Intervenors have also presented proposed supplemental findings and conclusions relating to certain issues raised during the appellate state of this proceeding. To the extent that intervenors' contentions relate to requirements for environmental review of this reactor, they are considered in Part 7 of this Decision. Following is

17. See e.g., "The Evaluation of Risks from Radiation", ICRP Publication 8; Melvin R. Sikov and D. Dennis Mahlum, "Radiation Biology of the Fetal and Juvenile Mammal," USAEC Division of Technical Information, Dec. 1969; Robert W. Miller, "Radiation, Chromosomes and Viruses in the Etiology of Leukemia," New England Journal of Medicine, Vol. 271, No. 1. (July 2, 1964), p. 30.

our resolution of other questions raised by the intervenors which have not been covered in the previous parts of this Decision.

1. Intervenors have taken exception to the Licensing Board's ruling that it lacks authority to weigh the benefits or lack thereof which may be derived from the proposed operation of the reactor. The Licensing Board, relying on issues set forth in the notice of hearing as delimiting the scope of the hearing, ruled that the intervenors' proposed findings of fact on this subject are "irrelevant to the noticed issues". The noticed issues were those relevant under provisions of the Atomic Energy Act and its implementing regulations. Insofar as the Licensing Board's ruling related to those issues, it was correct.

2. Intervenors have taken exception to the Licensing Board's ruling that the question of transporting radioactive material to and from the reactor is not germane to the proceeding. The Board found the issue "irrelevant" because of the jurisdiction of the Department of Transportation over the transportation of radioactive materials and over safety regulations with respect thereto. This ruling was correct. (See our discussion of transportation in Part 7 of this Decision.)

3. The intervenors have taken exception to the Licensing Board's ruling that the proposed reactor is not a "testing facility", as that term is used in Commission regulations. The Licensing Board based its ruling on the answer to a certified question which we provided in our Memorandum of May 26, 1970, in this proceeding. In that Memorandum, we concluded that the term "testing

facility", as defined in 10 CFR Section 50.2(r), did not include a research reactor with power levels such as that sought for the Columbia reactor. The intervenors, in their exceptions and supporting brief, rely only on the brief which they earlier submitted to the Appeal Board in consideration of the certified question. On that basis, we see no reason to modify our views as previously expressed.

4. In their exceptions, the intervenors state that they

> "assume that the data required to comply with paragraph 69 of the initial decision, the plans for minimizing the discharge of argon-41 set forth in paragraph 43 of the decision and the recommendations in paragraph 70 of the decision would be incorporated, prior to any licensing in a new and final Safety Analysis Report and Operating Procedures, and that the said intervenors would be given the opportunity to cross-examine the applicant and present evidence with respect thereto before the Atomic Safety and Licensing Board. See 10 CFR Sections 2.743(a), 50.30(c)(2), 50.34(b) and 50.35(c)."

The intervenors take exception to the Initial Decision "to the extent that [they] may be incorrect in this assumption".

The "data required to comply with paragraph 69", which concerned the fission products release fraction under postulated accident conditions and the criteria for evaluating the effects of such a postulated accident, were considered during the appellate stages of this proceeding.

(See Parts 2 and 3 of this Decision.) Intervenors were afforded appropriate rights of cross-examination, and opportunity to present evidence, on these questions.

As for paragraph 43 of the Initial Decision, the applicant's plans for minimizing the discharge of argon 41 were considered by the Licensing Board and found satisfactory. Whether the applicant carries out its responsibilities for minimizing such discharge, as required by the Initial Decision, is a question falling within the compliance responsibilities of the Director of Regulation and is not a matter which must be considered in this proceeding.[18] Similarly, the matter of the applicant's compliance with the conditions of paragraph 70 (to the extent they remain applicable under this decision) is also within the compliance responsibilities of the Director of Regulation. We note that the provisions of subparagraphs 70.A, 70.B and 70.C have been superseded by other conditions imposed by this Decision.

5. In their proposed supplemental conclusions of law submitted on March 27, 1972, the intervenors allege that the Appeal Board violated section 191 of the Atomic Energy Act, the regulations in 10 CFR Section 1.19-21, 2.721 and 2.785, and the due process clause of the Constitution, by its conducting evidentiary proceedings as part of the appellate consideration of this license application. Intervenors previously raised the same point in their motion of June 21, 1971, and the Appeal Board rejected their contentions. In our Memorandum and Order

18. The procedures prescribed for enforcement proceedings appear in 10 CFR Part 50, Subpart B.

of August 6, 1971, we found the holding of such an evidentiary proceeding to be consistent with the provisions of the Administrative Procedure Act and the Atomic Energy Act, and that the Appeal Board had the authority to take evidence incident to its appellate review. Intervenors here present no new reasons why we should modify our views. Accordingly, their conclusion on this subject is rejected.

6. In the proposed supplemental conclusions, intervenors have also contended that the Appeal Board violated 10 CFR Section 2.703 in failing to hold the appellate hearings in New York City. Our Memorandum and Order of August 6, 1971, which found it appropriate and consistent with Commission regulations for the appellate proceeding to be held in Washington, D.C., where the Appeal Board is permanently located, is dispositive on this question. Intervenors' proposed conclusion on this subject is accordingly rejected.

7. Environmental Review

In their exceptions to the Initial Decision, and in their brief filed by letter dated March 27, 1972, the intervenors have asserted that an environmental statement is required for this licensing action under the requirements of the National Environmental Policy Act of 1969 (NEPA).[19]

NEPA, by its terms, requires an environmental report for every "major Federal action[s] significantly affecting

19. 42 U.S.C. 4321, et seq.

the quality of the human environment".[20] Under 10 CFR Part 50, Appendix D, the Commission's regulations implementing NEPA, only facilities falling within specified categories — i.e., a "nuclear power reactor, testing facility, or fuel reprocessing plaint" — have generically been made subject to the requirements for an environmental report.[21] The regulations in Appendix D have, however, explicitly reserved for the Commission the authority to include under those procedures "such other production or utilization facility whose construction or operation may be determined by the Commission[22] to have a significant impact on the environment." No such determination has thus far been made for research reactors.

In seeking to have the procedures of Appendix D made applicable to this licensing action, the intervenors recognize that, under Appendix D, the Commission must first determine that the Columbia reactor is one whose operation has "a significant impact on the environment". They state, however, that the "Commission has delegated all its authority in Part 50 licensing proceedings to the Atomic Safety and Licensing Appeal Board, 10 CFR Section 2.785(a)", and they urge the Appeal Board to

20. 42 U.S.C. 4332(2)(C).

21. 10 CFR Part 50, Appendix D. Section A.I. As discussed in Part 6 of this Decision, supra, the Columbia University research reactor is not a "testing facility", as that term is used in Commission regulations.

22. For purposes of 10 CFR Part 50, of which Appendix D is a part, "Commission" is defined as "the Atomic Energy Commission or its duly authorized representatives." 10 CFR Sec. 50.2(h).

make the determination as to whether NEPA requirements are applicable to this licensing proceeding. The applicant, in its submissions of September 14, 1971, and March 6, 1972, has also recognized that the Appendix D regulations leave open the question whether a research reactor facility such as the one involved in the present proceeding will be subject to the Commission's revised environmental procedures and regulations, and has suggested that the Appeal Board certify to, or request definitive views of the Commission on this subject. The regulatory staff, in a Memorandum dated March 24, 1972, takes the position that the Commission clearly did not include research reactors in the group of licensing proceedings subject to the Appendix D procedures and that, accordingly, it is unnecessary to certify to the Commission the question of applicability of Appendix D to the Columbia reactor.

These positions of the parties essentially raise two questions — i.e., whether the Appeal Board has the authority to make the determination as to whether Appendix D should be applicable to the Columbia reactor; and, if so, whether the Columbia reactor will have the "significant impact" requisite for invoking the Appendix D procedures. To deal first with the procedural question, we take the view that the authority to determine whether research reactors considered generically would have the environmental impact requisite for invoking the Appendix D procedures is essentially a rule making determination, and beyond the delegated authority of the Appeal Board.[23] Moreover, as a general matter, the Appeal Board

23. See 10 CFR Sec. 2.785.

elieves it preferable for questions of this sort to be esolved as a matter of rule making, rather than on an ad oc basis in an individual proceeding. We are also of the iew, however, that the Appeal Board's authority includes he entire adjudicatory authority of the Commission in the nstant proceeding. Since the issue of NEPA applicability as been raised as an issue in this proceeding, and since the Commission in Appendix D has left open the question whether or not the NEPA procedures are applicable to esearch reactors, we consider it appropriate for the Appeal Board to determine whether, on the facts appearing in the record of this proceeding, the NEPA procedures should be made applicable to the licensing of the Columbia reactor.

With respect to the substantive question, the Appeal Board has reviewed the entire record of this proceeding. Based upon this review, we have concluded that the licensing of the Columbia reactor will not have a "significant impact on the environment" and, accordingly, that the Appendix D procedures are not applicable to this licensing action.

In reaching this conclusion, the Appeal Board has been mindful of the guidelines for preparation of environmental reports issued by the Council on Environmental Quality, the body charged by NEPA and Executive Order 11514 with exercising executive-branch oversight of agencies' programs relating to environmental quality.[24] The

24. E.O. 11514, 35 F.R. 4247 (March 7, 1970).

guidelines provide, among other things, that a statement is to be prepared if there is "potential that the environment may be significantly affected". The guidelines further provided that a statement should be prepared for proposed actions "the environmental impact of which is likely to be highly controversial". [25] We do not construe the latter provision as contemplating the preparation of a NEPA environmental report whenever a party contends that the environmental effect of a proposed action is "controversial". In our view, such a report should be prepared only where an agency additionally finds that there is substance to the contentions that there is a potential for a significant environmental impact. Any other approach places an undue premium upon "controversy".

As we point out below, we have found that the proposed operation of the Columbia reactor will result in no significant environmental effect, and indeed lacks even the potential for such an effect. Moreover, we have considered each of the points concerning which the intervenors have raised a contention and have found them insufficient, both individually and collectively, to serve as a basis for requiring the preparation of an environmental report.

A. From our reading of intervenors' March 27, 1972, brief, together with their proposed supplemental conclusions of law, we understand that intervenors are stating four reasons for their belief that an environmental report is required for the Columbia reactor. Specifically:

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25. Guidelines, Section 5(b), 36 F.R. 7724.

Decision

1. Intervenors cite "the hazard to the embryo, fetus and infant" as described in the testimony of Dr. Sternglass as a basis for requiring an environmental report. As indicated in Part 5 of this Decision, the Appeal Board concluded that Dr. Sternglass' allegations are not substantiated by the facts which he has presented in their support, and are premised at best on a highly questionable use of those facts. We found his methodology to be deficient, that many of his assertions were inconsistent and even self-contradictory and his statistical methodology and selective sampling techniques not to be scientifically credible. Accordingly, we held that his allegations did not present a basis for a challenge to the Part 20 standards. We similarly find that Dr. Sternglass' allegations present no basis for concluding that the Columbia reactor will have a significant environmental effect, or the potential for such an effect.

2. Intervenors suggest "the possibility of releases far in excess of maximum dose limits in the event of the maximum credible accident postulated by the said intervenors" as a basis for requiring an environmental report. The Licensing Board evaluated the maximum credible accident postulated by intervenors and rejected it, finding that "credibility is not the mark of the accident possibilities which the intervenors have described in support of the accident which they would postulate for safety calculation purposes."[26] In Part I of this Decision, we affirmed the Licensing Board's holding in this respect. We see no basis for accepting the accident postulated by the intervenors for purposes of evaluating the

26. Initial Decision, par. 54.

environmental impact, if any, of this reactor. Under the postulated accident conditions we consider appropriate, radiation releases, even if the accident should occur, would be below the limits set forth in 10 CFR Part 20 for normal, licensed operation. (See Part 3 of this Decision.) Under those circumstances, and considering the remote probability that such an accident could ever occur, we find the hypothetical environmental impact of the radiation releases which may be expected from this reactor under accident conditions to be de minimis.

3. The third reason advanced by intervenors in support of a requirement for an environmental report is "the hazards from releases from the reactor in the course of normal operations". An extensive record on this subject was considered by the Licensing Board, which concluded that, under normal operating conditions, there was "reasonable assurance that operation . . . can be conducted without endangering the health and safety of the public".[27] No exception was taken to that conclusion; and, after extensive review of the record, we find no reason to modify it. Moreover, we find nothing in the record which would lead us to conclude that the projected releases from the Columbia reactor during normal operations would result in a significant impact on the environment, or the potential for such an impact. In that connection, we note that argon 41 is the only meaningful gaseous effluent from this reactor. The radioactive releases, including that of argon 41, resulting from the reactor's operation are well within the requirements of 10 CFR Part 20.[28]

27. Initial Decision, par. 64.

28. See 10 CFR Sec. 20.106(a) and App. B., Table II, Col. 1.

Additionally, argon 41 is an inert gas which is odorless, tasteless and colorless. Being inert, it does not combine chemically with any atmospheric constitutent or with water or any element of the food chain or the body itself, and therefore does not accumulate in the body. Considering the characteristics of argon 41 and the small radioactive releases involved, which as we have already stated are well within the requirements of 10 CFR Part 20, there is no significant environmental effect from this gas.

4. The final reason asserted by intervenors for requiring an environmental report for this reactor is "the hazards arising from the removal, transportation and storage of irradiated fuel originating from the reactor".

Irradiated fuel is that which has been used in the reactor and which thereafter must be disposed of by the licensee. From a safety standpoint, the shipment of irradiated fuel is covered by appropriate regulations of the Department of Transportation and the State of New York; certain packaging requirements are covered by Commission regulations.[29] We have concluded, for reasons hereinafter set forth, that the transportation of irradiated fuel from the Columbia reactor (as well as the transportation of fuel to the reactor) will not have a significant environmental impact, or the potential for such an impact.

The record in this proceeding reflects that, insofar as transportation is concerned, "research reactors, and especially a TRIGA reactor, are quite different than power production reactors;"[30] and, further, that, unlike fuel for

29. See discussion in Part 6 of this Decision.

30. Testimony of William W. Havens, L.B. Tr. 370.

power reactors, Triga fuel is normally kept in the reactor for the life of the reactor, or in any event for several years.[31] The record also indicates that the fuel will be shipped in containers which must meet stringent safety standards, and that the shipments must conform to Department of Transportation regulations dealing with the transportation of radioactive materials.[32] The rules governing such shipment are designed to assure that in an accident any radioactive releases will not constitute a threat to the public health and safety.

From other than a radiological safety standpoint, the environmental impact of the shipment of irradiated fuel is de minimis, involving, at the most, a few trucks at the time of fuel reloading, which occurs only once over the course of two or three (or more) years and which may occur only once during the life of the reactor. While an increase in truck traffic may be an environmental effect which might require the preparation of a NEPA environmental report, *City of New York v. United States*, 337 F. Supp. 150 (E.D.N.Y. 1972), there is a qualitative, as well as a quantitative, difference between the annual addition of some 26,000 trucks which the *City of New York* court found significant, and the three or four trucks a year

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31. See prepared testimony, Richard B. Chitwood, p. 7, following L.B. Tr. 464. See also L.B. Tr. 457-8.

32. Chitwood prepared testimony, pp. 5-7; also L.B. Tr. 480-481.

which would be required to service the Columbia reactor.

We accordingly find the environmental impact of the transportation of irradiated fuel from the reactor to be insignificant. The transportation of fuel elements to the reactor, which will occur once prior to startup of the reactor, and thereafter when refueling is necessary is even more insignificant, because of the absence of fission products.[33] On the basis of the foregoing, we hold that the transportation of fuel to or from the reactor will not have a "significant impact" on the quality of the human environment, or even the potential for such impact.

B. Having disposed of the specific environmental contentions raised by the intervenors, the Appeal Board has also considered whether there are other potential significant environmental effects arising from operation of the Columbia reactor. We find there are none. For example, from an aesthetics standpoint, there will be no environmental effect, since the reactor will be located in an existing building and there will be no transmission lines or comparable visual features associated with this reactor. Also, the liquid effluents will have no significant effect on the environment. In reaching this conclusion we have considered both the thermal impact of the liquid and the radioactivity contained in it. The small quantities of warm water which may be released from the reactor vessel will be held in a sump and released periodically after cooling. This holdup has the effect of reducing the temperature of the water to the point where its environmental effect is essentially zero. Similarly, the holdup reduces the already

33. Chitwood prepared testimony, at p. 7.

low level of radioactive elements so that the effect on the environment is also minimal. [34]

Intervenors' exceptions relating to the rulings of the Licensing Board with respect to its jurisdiction to consider the benefits or lack thereof derived from the reactor, and the matter of transporting radioactive material to and from the reactor, have been discussed under Part 6 of this Decision, insofar as issues under the Atomic Energy Act were involved. To the extent that these exceptions raise environmental questions, we have considered them and find that no significant environmental impact will be produced through operation of the reactor. Accordingly, the procedures of 10 CFR Part 50, Appendix D, requiring preparation and consideration of an environmental report, are not required to be followed in this proceeding.

8. Conclusion

For the reasons stated, we conclude that issuance of the operating license will not be inimical to the health and safety of the public. We additionally conclude that operation of the reactor will not have a significant impact on the environment and, for that reason, that an environmental statement under the National Environmental Policy Act is not required. Hence, under Commission regulations, issuance of such a license may be authorized. When this Decision becomes final, in accordance with the last paragraph hereof, the Director of Regulation is authorized to issue to the applicant such a license, incorporating the following conditions:

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34. The amount of radioactivity in the water was considered in detail by the Licensing Board in its Initial Decision.

Decision

1. The truck door in the parking area must be sealed with rubber tape during all periods of time in which the reactor is in operation.

2. The applicant must adhere to the protective measures outlined in Part 4 of this Decision, and in the Appendix.

3. The applicant must adhere to all conditions appearing in the Initial Decision of the Licensing Board, except those conditions appearing in subparagraphs 70.A, 70.B, and 70.C, which have been superseded by conditions appearing in this Decision.

This Decision is subject to the filing of a petition for reconsideration under 10 CFR Section 2.771. The filing of any such petition shall stay the effect of this Decision pending ruling thereon. If no such petition is filed, this Decision shall constitute final action of the Commission and shall take effect fifteen days from the date of its issuance.

It is so ORDERED.

By the Atomic Safety & Licensing Appeal Board

s/ William L. Woodard
William L. Woodard
Executive Secretary

Attachment:
Appendix

Decision

Dated: May 18, 1972

DOCKET NUMBER
PROD. & UTIL. FAC. 50-208

APPENDIX

Following are the requirements relating to the physical protection of the reactor which shall be made a condition of the operating license:

A. Control Room

1. Access to the control room is to be controlled at all times by special keys or electric locks operated from control panel.

2. Issuance of keys is to be carefully controlled and limited to the minimum number for operational purposes. As noted on page 15 of this Decision, keys are to be issued only to responsible faculty members and the Reactor Supervisor; control room keys are not to be given to students.

3. An alarm system (including break glass alarms) will be installed on windows and access doors to the control room. The alarm system will be installed in such a manner as to energize a warning system at guard headquarters in case of any attempted unauthorized entry. This alarm system will be activated during the hours when the control room is unoccupied, and will

be activated or deactivated only by a key under the control of the University guard force. Except when being used by a guard to activate or deactivate the alarm system, the key will be retained at guard headquarters.

B. Reactor Room

1. Access to the reactor room is to be controlled at all times. Doors to this room will be of a type which can be opened only by use of special keys or by deactivation of electric locks operated from the control panel.

2. An alarm system will be installed on the access doors and windows (including a break glass alarm). When the control room is unoccupied, this alarm system will be activated. The alarm system will be constructed so as to show a "lock on" alarm signal at guard headquarters and will be activated or deactivated only by a key under the control of the University guard force. Except when being used by a guard to activate or deactivate the alarm system, this key will be retained in the guard headquarters.

If desired, this system may be provided with a short time electrical cutoff from the guard headquarters to allow entry of authorized personnel during off hours.

3. No "take-home" keys will be issued to anyone for the reactor room unless the University concludes it necessary to allow the issuance of such keys to the faculty member in charge of the reactor and to the

Decision

Reactor Supervisor. With these possible exceptions, the reactor room keys will be retained at guard headquarters. On prior notification by specially designated University personnel (such as the faculty member in charge of the reactor or the Reactor Supervisor) the guard headquarters will release a key to designated staff members or students upon presentation of proper identification. This key will be returned to the guard headquarters when the student or faculty member finishes required work in the reactor room.

4. In addition to the previously mentioned alarms and access control, an area alarm will be installed which covers the top of the reactor. This alarm will be activated or deactivated only by authorized people with access to the control room.

5. A guard inspection of the reactor room and the reactor control room is to be made at least on an hourly basis. In order to give the guard a reasonable view of each of the rooms without entering therein, a wide-angle viewing system will be installed for each room.

MEMORANDUM AND ORDER

DOCKET NUMBER
PROD. & UTIL. FAC. 50-208

UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD:

In the Matter of

TRUSTEES OF COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Docket No. 50-208

MEMORANDUM AND ORDER

On May 30, 1972, a petition for reconsideration of the Appeal Board's decision of May 18, 1972, was filed by the intervenors Morningside Renewal Council, Inc. and Riverside Democrats, Inc. The AEC regulatory staff has filed a response dated June 6, 1972.

The May 18, 1972, decision authorized issuance of an operating license, subject to specified conditions. Its effective date was fifteen days from the date of its issuance, but it further provided that the filing of a petition for reconsideration shall stay the decision. The timely filing by intervenors of their May 30, 1972, petition thus operated to stay the Appeal Board's decision.

Memorandum and Order

Intervenors' petition seeks reconsideration on the ground that the Appeal Board erred in "failing to consider and rule upon [intervenors'] proposed supplemental findings of fact and proposed supplemental conclusion of law number 1", as required by the Administrative Procedure Act and the Commission's Rules of Practice. To the contrary, the Appeal Board's decision explicitly recited that the Appeal Board had reviewed the "entire record of this proceeding, including the exceptions and responses thereto filed by the parties, and the additional evidence and submissions made to the Appeal Board during the appellate proceeding." (Decision, p.6) This record included the proposed supplemental findings of fact and conclusions of law filed by the intervenors. The subject matter of each proposed finding of fact and conclusion of law of the intervenors was considered during the course of the decision.

To deal first with the proposed findings of fact, finding number 1 concerns applicable criteria for evaluating a postulated accident. This subject was covered in detail by the decision, particularly part 3 thereof. Proposed findings 2 and 3 concern the experiments relating to the fission products release resulting from a postulated accident, a subject which was extensively covered by the decision, particularly part 2 thereof. Proposed finding 4, dealing with the provisions of paragraph 70 of the initial decision, is covered in part 6 of the decision, as well as in the conditions required by the decision to be included in the operating license.

Proposed finding 5 relates to the adequacy of the security provided for the reactor. The Appeal Board's decision extensively considered this subject, particularly in Part 4 and in the Appendix, and it imposed substantial protective measures designed to enhance the physical security of the reactor. Proposed finding 6, relating to the need for the reactor, was considered in parts 6 and 7 of the decision. The remaining proposed findings of fact (7-24) all related to the testimony of Dr. Ernest Sternglass, and responses thereto. This subject was considered in great detail in the decision. See, in particular, part 5 and part 7(A.1).

Proposed supplemental conclusion of law number 1, to which the intervenors make specific reference, states that the applicant and the intervenors are the "real parties in interest in the proceeding", and that the relief accorded to the applicant by the Appeal Board should not be any greater than that sought by the applicant in its exceptions. Intervenors refer particularly to suggestions made by the applicants concerning the conduct of further experiments with respect to the fission products release fraction under postulated accident conditions. While the particular course of experimentation accepted by the Appeal Board in this proceeding may not have paralleled that suggested by the applicants or sought by the intervenors, we expressed the view that the new experiments, together with additional information on older experiments, provided the data sought by both the applicant and the intervenors. (Decision, p. 11.) We note that an administrative agency is authorized —

indeed is required — to do more than "simply . . . sit back, like an umpire, and resolve adversary contentions at the hearing."[1] Our conclusion to accept the results of the experiments appearing in the record of this proceeding — including the appellate record — was well within the discretion available to us.

A decision meets the requirements of the Administrative Procedure Act, as well as the Commission's Rules of Practice, if it sufficiently informs a party of the disposition of its exceptions.[2] In view of the detailed treatment in our decision of each of the subjects included in intervenors' proposed supplemental findings of fact and conclusions of law, including those to which intervenors refer in their petition for reconsideration, we are of the opinion that the requirements of the Administrative Procedure Act and the Commission's Rules of Practice were fully satisfied. Intervenors' petition for reconsideration is accordingly denied.

Intervenors' petition also seeks a stay of the effective date of the operating license, pending judicial review, if the Appeal Board should adhere to its

1. *Calvert Cliffs' Coordinating Committee, Inc. v. Atomic Energy Commission*, 449 F.2d 1109, 1118-19 (D.C. Cir. 1971); *Scenic Hudson Preservation Conference v. FPC*. 354 F.2d 608, 620 (2d Cir. 1965).

2. *NLRB v. Wichita Television Corp.*, 277 F.2d 579, 585 (10th Cir. 1960); *North American Van Lines, Inc. v. U.S.*, 217 F.Supp. 837, 843 (N.D. Ind. 1963).

previous decision. Intervenors assert that they propose to seek such judicial review, and ask for a stay to "preserve the right to such review unimpaired by the substantial change of circumstance that would be caused by the fueling or operation of the reactor". The intervenors further refer to the concern of various persons in the area of Columbia University with the issues in the case, and the circumstances that certain issues were "of sufficient gravity" to cause the Licensing Board to refrain from granting the operating license.

In this particular connection the record upon which the Appeal Board rendered its decision, of course, contains additional and clarifying material that supplements the record upon which the Licensing Board based its initial decision. The specific issues of concern to the intervenors have been extensively reviewed by the Appeal Board. Moreover, the Commission's Rules of Practice contemplate immediate effectiveness of a decision authorizing issuance of an operating license, prior to the completion of judicial review, with provision for granting a stay upon a showing of "good cause" (10 CFR Section2.764, 2.770). A showing of "good cause" requires that there be shown circumstances such as those which would cause a court to grant a preliminary injunction -- including, among other factors, a showing of irreparable injury. [3]

3. See e.g., *Virginia Petroleum Jobbers Assn. v. FPC*, 259 F.2d 921, 925 (D.C. Cir. 1958); *In the Matter of Wisconsin Electric Power Co., and Wisconsin-Michigan Power Co.*, (Point Beach Nuclear Plant, Unit 2), Docket No. 50-301, Appeal Board Memorandum and Order, dated June 10, 1972.

Memorandum and Order

Intervenors have shown no irreparable injury if the stay is not granted. We indicated previously, in our decision of May 18, 1972, that issuance of the operating license "will not be inimical to the health and safety of the public". In this connection we found that even under the conditions of an unlikely design basis accident, calculations of the limited amounts of radioactivity released showed that they would be below that which Commission regulations allow for normal operation. These calculations were made on the assumption that the accident occurred after infinite operation of the reactor at full power. [4] During the period of fuel loading, criticality tests and early intermittent operation of the reactor -- the activities which may reasonably be expected to occur during the period of any judicial review – no such inventory of radioactivity would be built up so that releases from an accident would be even less.

For these reasons, we conclude that intervenors' have not shown "good cause" for a stay pending judicial review. Intervenors' petition is accordingly denied.

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4. Applicant's Safety Analysis Report, p. 143, Section 6.531, paragraph 1; General Atomic's "Hazard Report for the 250 KW TRIGA Mark II Reactor", Report GA-2025, Appendix A., pp. A-1 and A-2; Applicant's Response to Board's Request for Additional Data, Question 1, page 1-1, "Description of Calculations" (first paragraph).

Memorandum and Order

This order, together with the decision of May 18, 1972, constitutes the final action of the Commission in this proceeding, and is effective immediately.

It is so ORDERED.

By the Atomic Safety and Licensing Appeal Board

s/ William L. Woodard
William L. Woodard
Executive Secretary

Dated: July 28, 1972